



Scanning -- Shortwave -- Satellites -- Ham Radio -- Computers

Volume 21, No. 12
December 2002

U.S. \$4.95

Can. \$7.95

Printed in the
United States

Monitoring Times

A Publication of Grove Enterprises

*The Monitoring Times Guide to
APCO P-25 Systems*

Also in this issue:

- How Repeater Systems Work
- Wildlife Tracking
- Radio Canada International



AOR introduces the NEW AR8200 Mark III

NEW! AR8200 Mark III

- New TCXO for greater stability – performance not found in most desktop units!
- Covers 500 KHz ~ 3 GHz – world's first handheld with this range!*
- Ni-MH batteries included (1500mAh)
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- 40 search banks
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- Alphanumeric channel and bank labels
- Computer control and programming. (requires optional connection cable)
- Download free control software from AOR web site!
- "All Mode" reception includes "super narrow" FM plus wide and narrow AM in addition to USB, LSB, CW and standard AM and FM modes
- True carrier reinsertion in USB and LSB modes. Includes 3 KHz SSB filter!
- Detachable MW antenna with negative feedback
- Optional internal slot cards expand the Mark III's capabilities. Choose from Memory Expansion (up to 4,000 memories), CTCSS Squelch & Search, Tone Eliminator, and Record Audio (saves up to 20 seconds of audio)
- Tuning steps programmable in multiples of 50 Hz in all modes
- 8.33 KHz airband step is correctly supported
- Noise limiter and attenuator
- Band activity "scope" display with "save trace" capability
- Four-way side panel rocker switch allows one-hand operation
- Large, backlit, multifunction display and illuminated keypad
- Battery Save function with Low Battery indicator
- Operates on 12 VDC external power
- BNC antenna connector
- Wide choice of accessories

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Now you can own the world-class AR8200 Mark III portable receiver with unparalleled frequency coverage from 500 KHz to 3 GHz. An even better Temperature Compensated Crystal Oscillator for solid frequency stability. Improved RF circuits combine greater sensitivity, resistance to intermod products and enhanced Signal to Noise ratios. The Mark III features better audio frequency response and includes NiMH AA cells that can be charged while operating the receiver. When you're ready for the best, you're ready for AOR –

The Authority on Radio.™

*Cellular blocked on USA models, unblocked version available to qualified agencies, documentation required. Specifications subject to change without notice or obligation.

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G3

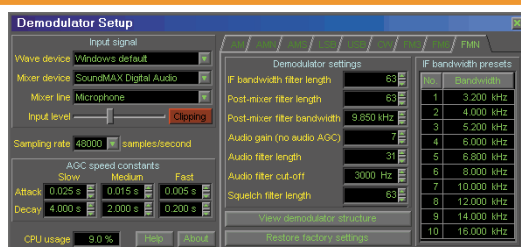
Introducing a breakthrough

Front Panel

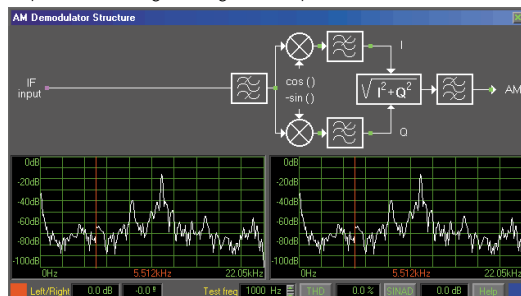


An intuitive control panel features a wide variety of tuning and scan modes, memory functions, and many other facilities.

Demodulator



The Professional Demodulator (optional) is adjustable in many respects, including the digital filter parameters.



The Professional Demodulator (optional) includes interactive block diagrams for all modes, with two real-time spectrum scopes and THD and SINAD measuring facilities.

Spectrum Scope



The secondary wide-band spectrum scope complements the primary narrow-band one.

Specifications

- Frequency range: 9 kHz to 30 MHz • Tuning resolution: 1 Hz
- Modes: AM, AMN, AMS, LSB, USB, ISB*, DSB*, CW, FM3, FM6, FMN
- Antenna: 50ohm (SMA) • Dynamic range: 95dB • IP3: +8dBm

*Professional Demodulator Option only

System Requirements

- IBM PC compatible (CPU 500MHz or higher, PCI slot)
- Sound Blaster 16 (or compatible sound card)
- Windows 98/ME/NT/2000/XP

Specifications are subject to change without notice. WINRADIO and G3 are trade-marks of WINRADIO Communications. WINRADIO technology is protected by US Pat. No. 6,289,207 and other existing or pending patents or patent applications.
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Just when you thought that there is nothing in shortwave that could surprise you anymore, here comes the new WinRADIO G303i Receiver.

This new receiver continues in the fine tradition established by WinRADIO's successful range of wide-band PC-based receivers. The "G3" stands for "the third generation": As the original, award-winning, first-generation WR-1000i receiver was the world's first commercially available wide-band receiver on a PC card when launched seven years ago, the newly introduced WR-G303i is the world's first dedicated shortwave receiver on a PC card. It is also the first commercially available receiver where the entire final intermediate frequency stage and an all-mode demodulator are entirely executed in software, running on a PC.

The advantages of this receiver are too numerous to list in this limited space: In addition to the flexible and friendly user interface of a PC-based receiver, with its numerous functions and facilities not normally available on any conventional receiver, the WinRADIO G303i Software-Defined Receiver excels particularly by the ability of its demodulators: While the Standard Demodulator provides the performance of a highly respectable shortwave receiver including synchronous AM demodulation and a real-time spectrum scope, the optional Professional Demodulator offers even more: continuous IF bandwidth adjustment (in 1Hz increments), interactive block diagrams with two additional audio spectrum scopes, and even built-in THD and SINAD measurement facilities. Additional demodulators are planned as further options, including a DRM (digital radio) demodulator.

The WinRADIO G303i - a ground-breaking shortwave receiver that will surely amaze you.



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Monitoring Times

Vol. 21, No. 12 December 2002



Lead Story

How Repeater Systems Work

By Dan Yemiola

Repeater systems are not all created equal. In an easy-to-understand style and clear illustrations, the author demonstrates a variety of systems and how each is designed to meet a specific requirement or overcome specific problems. Story starts on page 10.

On the Cover: The highest point in Georgia is Brasstown Bald located in the Chattahoochee National Forest. In addition to housing a visitor's center and Ranger station, it's an excellent repeater site, serving the US Forest Service, State Highway Patrol and other federal, state, and local agencies. (Photo by Harry Baughn.)

Radio Canada International..... 12

By Bill Bergadano

Canada's external radio service signed on the air December 25, 1944, and has been a favorite of many listeners ever since. But the road has not been easy. The author recounts the troubles the station had in getting on the air in the first place, and its precarious existence since 1990.

Use Your Scanner to Track Wildlife 14

By Joe Moell

A few years ago, amateur radio operators and scanner listeners were first asked to help in a project to find the winter habitat of the Burrowing Owl. Researchers knew they hatched out in Saskatchewan and Alberta during the summer. They also knew they returned each year in greatly diminished numbers. But, they couldn't answer why, because no one even knew just where they went for the winter.

This is the kind of information that can be gained by tracking signals from a tiny transmitter attached to individual animals from the target group. You can help. You can patiently monitor for signals or you can try your hand at tracking if you think you've detected a transmission. It's a good cause, and you'll enjoy it!

Monitoring Times Guide to APCO P-25 Systems..... 18

By Dan Veeneman

With the prospect of new scanners that can monitor APCO Project-25 digital systems many hobbyists are wondering, how do I know if the digital system in my area is compatible? And where do I get the frequencies I'll need?

This huge list of known APCO systems and frequencies, researched by *MT's* trunking columnist, is the beginning of our effort to answer these questions. This month's installment covers Alabama through Florida. It's an on-going project: one which will involve our readers, too, as talk-groups are discovered and as we learn the ins and outs of the new digital scanners.

GRUNDIG SHORTWAVE

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Unbeatable Price..."*

Lawrence Megre-Editor in Chief, Passport to World Band Radio.

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Liquid Crystal Display shows all important data: Frequency, Meter band, Memory position, Time, LSB/USB, Synchronous Detector and more.

The Signal Strength Meter Elegant in its traditional Analog design, like the gauges in the world's finest sports cars. Large. Well Lit. Easy to read.

The Frequency Coverage Longwave, AM and shortwave: continuous 100-30,000 KHz. FM: 87-108 MHz VHF Aircraft Band: 118-137 MHz.

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- For the traditionalist: a smooth, precise tuning knob, produces no audio muting during use. Ultra fine-tuning of 50Hz on LSB/USB, 100Hz in SW, AM and Aircraft Band and 20 KHz in FM.
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- For direct frequency entry: a responsive, intuitive numeric keypad.

The Operational Controls Knobs where you want them; Buttons where they make sense.

The best combination of traditional and high-tech controls.

The Sound Legendary Grundig Audio Fidelity with separate bass and treble controls, big sound from its powerful speaker and FM-sterio with the included high quality headphones.

The Many Features 70 user-programmable memories, Two 24 hour format clocks, Two ON/OFF sleep timers, Massive, built-in telescopic antenna, Connectors for external antennas - SW, AM, FM and VHF Aircraft Band, Line-out, headphone and external speaker jacks.

Size: 20.5" L x 9" H x 8" W

Weight: 14.50 lbs.



Satellit 800



Yacht Boy 300PE AM/FM/SW Radio

Power and Performance with Affordability

Designed for the traveller, the titanium look digital AM/FM/SW radio provides incredible power and performance for an incredibly low price! Packed with features, including 3 AA batteries, AC adapter, earphones, supplementary Antenna and carrying case!

State-of-the-art features include:

Digital tuning with 24 user-programmable memory presets, 13 SW Bands (2.30-7.80 MHz; 9.10-26.10 MHz), Illuminated multi-function LCD display screen, AM/FM stereo via earphones, Clock, alarm and 10 to 90 minute sleep timer, Digital tuning display, Direct frequency entry, DX/ local selector, Titanium look finish, External antenna jack, Dynamic micro speaker, Earphone jack, Telescopic antenna.

Size: 5.75" L x 3.5" H x 1.25" W Weight: 9.92 oz.



Yacht Boy 400PE AM/FM/SW Radio

Most powerful and compact portable

The Big Breakthrough! Power, performance, and design have reached new heights! The Grundig 400 Professional Edition with its sleek titanium look is packed with features like no other compact radio in the world. **Pinpoint Accuracy!** The Grundig 400PE does it all: pulls in AM, FM, FM-Stereo, every shortwave band (even aviation and ship-to-shore)-all with lock-on digital precision. **Ultimate Features!** Auto tuning! The Grundig 400PE has auto tuning on shortwave that stops at every signal and lets you listen. With the exceptional sensitivity of the 400PE, you can use the auto tune to catch even the weakest of signals. **Incredible timing features!** The Grundig 400PE can send you to sleep listening to your favorite music. You can set the alarm to wake up to music or the morning traffic report, then switch to BBC shortwave for the world news. The choice is yours! **Powerful Memory!** Described as a smart radio with 40 memory positions, the Grundig 400PE remembers your favorites-even if you don't!

Size: 7.75" L x 4.5" H x 1.5" W

Weight: 1 lb. 5 oz.

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for the traveler in you!

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MONITORING TIMES
(ISSN: 0889-5341;
Publishers Mail
Agreement #1253492)
is published monthly
by Grove Enterprises,
Inc., Brasstown, North
Carolina, USA.

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Periodicals postage paid at Brasstown, NC,
and additional mailing offices. Short ex-
cerpts may be reprinted with appropriate
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Address: 7540 Highway 64 West,
Brasstown, NC 28902-0098
Telephone: (828) 837-9200
Fax: (828) 837-2216 (24 hours)
Internet Address: www.grove-ent.com
e-mail: mt@grove-ent.com
Editorial e-mail: editor@monitoringtimes.com
Subscriptions: order@grove-ent.com

Subscription Rates: \$26.95 in US; \$39.50
Canada; and \$58.50 foreign elsewhere, US
funds. Label indicates last issue of subscrip-
tion. **See page 90 for subscription information.**

Postmaster:
Send address changes to *Monitoring Times*,
7540 Highway 64 West, Brasstown, NC
28902-0098.

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Owners

Bob and Judy Grove
judy@grove-ent.com

Publisher

Bob Grove, W8JHD
bobgrove@monitoringtimes.com

Managing Editor

Rachel Baughn, KE4OPD
editor@monitoringtimes.com

Assistant Editor

Larry Van Horn, N5FPW

Art Director

Bill Grove

Advertising Svcs.

Beth Leinbach
(828) 389-4007
beth@grove-ent.com

Reviews:

One of the best tools for identify-
ing and logging signals is some kind of
recording device. Bob Parnass looks
at a recorder specifically made for ra-
dio hobbyists: the **CCrane VersaCorder**. He also checks out the
**Mr Scanner FCC Frequency Da-
tabase** on CD (p.80). John Catalano
is also interested in recording – the
modern way. The **Coby MP-R650**
can record 32 megabytes of audio in

MP3 format for later playback on your
computer. And if you want to trans-
port MP3, pictures, programs or any
kind of file, the **USB Drive** is like a
hard drive you can hold in your palm
(p.82).

In this issue you'll also find lots of
good Christmas stuff (and stuffers) in
On the Ham Bands and *Bright Ideas*.
Happy Holidays!

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New for 2003

PASSPORT TO WORLD BAND RADIO

World's #1 Selling Shortwave Guide!

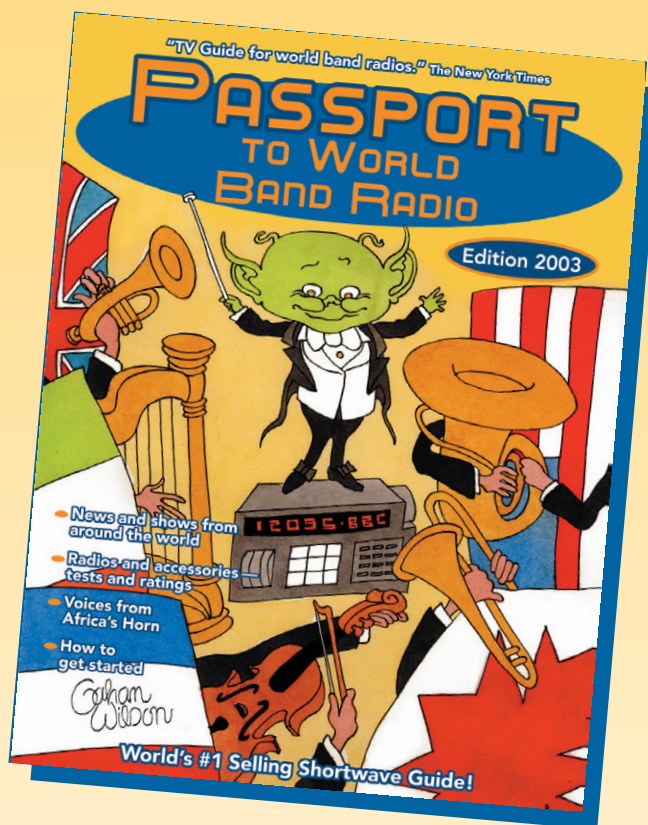
PASSPORT TO WORLD BAND RADIO

Richly illustrated, bulges with essential information.

PASSPORT'S frequency-by-frequency Blue Pages are nearly a book unto themselves. There are thousands of entries packed into 183 pages. Precise information, often confirmed by firsthand monitoring, for every transmitter on the air—times and days, transmitter locations and powers, target zones, networks, languages and jamming.

PASSPORT'S "What's On Tonight" also devotes 88 pages to detailing news, music, sports and entertainment shows in English. Need station contacts and Webcasts? PASSPORT'S "Addresses PLUS" chapter is the industry bible, 76 pages crammed with juicy tips. There's also a separate section on broadcasting in the Horn of Africa.

PASSPORT REPORTS includes over a hundred pages of rigorous tests, evaluations and scores for 61 portable, portatop, PC-controlled and tabletop receivers—17 outdoor and active antennas, too. *Outside* magazine minces no words, "The best. They tell you what's good about the good, bad about the bad, and advertisers be damned."



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R-2-06 A 'world' of listening that fits in your palm! (right) With its compact, drip resistant construction, the R-2 covers a wide 0.495-1309.995MHz range (cell blocked) in 9 bands. This little unit offers FM, WFM and AM modes along with 400 memories separated into 8 banks. Other features of the R-2 are auto squelch, CTCSS decode, PC programming capability (optional), data cloning capability, and quick and easy band switching. Requires 2 AA NiCad or alkaline batteries. 3.38" h x 2.28" w x 1.06" d, 6 oz ... **\$149.99**

R-3-26 See your information on screen. (left) Never before has a handheld receiver provided as much information as the 0.5-2450MHz (cell blocked) R3.

Receiving frequency, tuning step, memory channel, and more are visible on the 2" color display. Not only is operation status shown, but also broadcast visual information such as TV, sporting event cameras, security, and amateur TV. Use the R3 (with an optional camera) as a baby monitor or to see aerial shots from a personal aircraft. 2.41" w x 4.72" h x 1.28" d, 10.6 oz **\$339.99**



R-10-05 Tune in to the world where ever you go. The R-10 receiver has wide frequency coverage from 0.5MHz- 1300MHz (cell blocked) with all mode

receive capability. Real-time bandscope function makes it easy to find busy frequencies and to observe receiving frequency band conditions. Icom's original VSC function pauses scan only when modulated signals are received. Protect against data loss with the R-10's

bank and memory name functions. The SIGNAVI function bypasses clear frequencies, speeding up scans. 5.1" h x 2.3" w x 1.2" d, 11 oz ... **\$289.99**



as twin passband tuning, synchronous AM detection, DSP capabilities, remote PC control and more — shortwave listening is easier than ever. Use the 75 conveniently in a ham shack, den or vehicle. 9.5" w x 3.69" h x 9.03" d, 6 lbs, 10 oz **FREE DSP until 12/31/02 \$549.99**



Stimulate Your Brain! ICOM

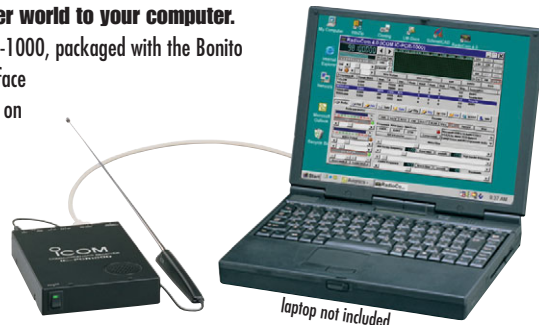
R-75 Wide frequency coverage, innovative features. The all mode R-75 communications receiver covers a wide frequency range from 0.03 to 60MHz allowing the user to listen in to a world of information. With innovative features such

from HF to 2GHz (cell blocked), including shortwave and VHF/UHF, while maintaining a constant receive sensitivity. The 8500 is a professional quality receiver with versatile features from high speed scanning to computer control. It also offers 1000 memories, a variety of scan options, various tuning steps, 3 antenna connectors, S-meter squelch, and voice synthesizer (requires optional UT-102). 11.3" w x 4.4" h x 12.2" d, 15.4 lbs **\$1399.99**



PCR-1000-02 BON Bring another world to your computer.

The lap/desktop PC-compatible PCR-1000, packaged with the Bonito Software, offers three receiver interface screens allowing the user to listen in on broadcast radio, television, ham stations, marine, aviation and more. Choose from a communications receiver, component-type or radio screen. It covers a wide frequency range from 0.5 to 1300MHz (cell blocked) and connects to a PC externally, providing compatibility with many PC models. The number of memory channels is only limited by the PC's free HD space or the amount of space available from the data storage source (zip, floppy, etc.). The AM/FM/SSB 1000 features real-time bandscope, automatic mode, IF shift function, noise blanker, digital AFC function, CTCSS tone squelch decode, and a variety of scans. 1.19" h x 5" w x 7.84" d, 2.2 lbs..... **\$354.99**



PCR-1000-02 The same features, functions, looks and operation as the receiver above; however, it does not come with the Bonito Software **Closeout \$279.99**



PCR-100-12 Cruise the airwaves with a computer.

The .01-1300MHz (cell blocked) PCR-100 receiver offers the user 2 screens, multi- and simple-function, to control listening via a PC. It also features plug 'n play operation, unlimited memory channels (depending upon HD space available), S-meter squelch, bandscope function and built-in tone squelch. The AM/FM 100 offers multiple scanning functions including program, auto-memory write, mode, and skip scans. A tunable bandpass filter provides stable operation. 1.31" h x 5.16" w x 6.09" d, 1 lb, 2 oz **Closeout \$209.99**

R-8500-02 Discover a world of information and intrigue.

Icom "next generation" technology brings you super wide band, all mode coverage as twin passband tuning, synchronous AM detection, DSP capabilities, remote PC control and more — shortwave listening is easier than ever. Use the 75 conveniently in a ham shack, den or vehicle. 9.5" w x 3.69" h x 9.03" d, 6 lbs, 10 oz **FREE DSP until 12/31/02 \$549.99**



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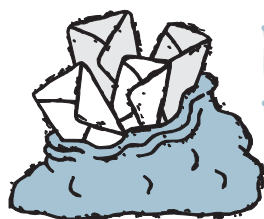
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LETTERS TO THE EDITOR

More Perspectives on Shortwave

"The September *Closing Comments*: 'Is Hobby Radio Dying? Two Perspectives...' was very interesting. The inexpensive portable SW radios with digital frequency readouts are responsible for me returning to the hobby after a 25 year hiatus. Furthermore, if anyone wants to reach me through any outlet other than SW they are out of luck, since I do not own a TV, never listen to mediumwave or FM, and receive no newspapers or magazines other than *Monitoring Times*.

"Speaking of hobby radio, please inform your readers that I am willing to exchange SWL cards with other shortwave listeners. They may write to me at 4927 Broadview Rd, #9, Cleveland, OH 44109."

— Matthew Weitendorf



"Your editorial in the September *MT* was, as usual, thought-provoking. While the attitude of the person who despaired for the future of hobby radio does have some basis, I tend to hope that Larry Van Horn's attitude has more justification.

"I've been listening on the shortwave bands for over a half century now. I had originally been inspired by articles on ham radio in the late 1940s ... I got one of the first novice tickets in 1951, upgraded to General class in 1952 and Advanced in 1977. As the years went by, I lost more and more interest in ham radio and developed more and more interest in SWBC.

"I was very sorry to see the BBC drop its North American broadcasts last year... It is ironic that just a few days before the BBC broadcasts were dropped, I had spent a day in a small tent in the Arctic National Wildlife Refuge, well above the Arctic Circle, listening to SW broadcasts on a little Sony SW-10; it would have been a boring day, indeed, without the radio to listen to, and there were definitely no AM or FM stations to be picked up there, and certainly no internet connection! I realize that was an unusual situation, but such situations do occur, to some of us anyway.

"I'll continue to listen as long as there's anything to listen to on the airwaves!"

— Jerry Brookman, KL7CMN, Kenai, Alaska

More on FRS in the Military

In response to a couple of *Communications* items about Family Radio Service radios being used for squad communications, we received the following letter about an earlier use for consumer-grade radios.

"I was in the US Navy twice, two different war times, two different jobs. Radio is my love but telephony has made my living. During my second tour between 1976-1980, to expedite hooking up my ship to shore phone lines, I allowed a set of cheap, low-power walkie-talkies to be used so the men would not have to yell from the pier to the deck 'Is it working?' or 'Try another jack.' There were always numerous phone calls which needed to be made before we all could depart our ship.

"It cut the time required to get hooked up by so much that nobody realized what kind of problems we were overcoming: The jacks on the pier were not always alive, or weren't the phone numbers we were told they would be, etc. Numbers were pre-assigned by shore as to their purpose, so the correct ones had to be found. I don't have to tell you the human factor that made this difficult, as well as noise (ambient and electrical), the weather (ice and snow in the jacks which were left uncapped), etc.

"The walkie-talkies came from Sears. They were plastic, had no squelch, got dropped and kicked and scraped up. But they still worked again and again. I think they were \$14.95 for the pair in 1978, purchased out of my own pocket. As far as the men were concerned, the job got done faster, got off the ship faster, got to hug and kiss their wives and kids faster, went home faster – the electricians, too, as they got the shore power cables connected faster.

"The walkie-talkies worked on 49.860 MHz. There was no okay from anybody to use them but no order not to use them, and plenty of officers and crew said hello to 'the home crew' over them. I also did no Ordinance Disposal with them!"

— Steven Harrsch, Bergenfield, NJ

MT Readers Come Through

Frank Lotito, K3DZ, "Below 535" column editor for *The Old Timer's Bulletin*, wishes to thank *Monitoring Times* and "the many *MT* readers that took the time to forward me information on carrier current communications." He would especially like to thank the anonymous reader from Fayetteville, NC, for the 1925 ATT Labs report! "This is the first pre-1936 article I've seen on this topic! It never ceases to amaze me how well developed the 'ancients' were in communications technology. Too bad they did not follow up on some of the earlier 'P-

N' junction investigations from the 1920s. Maybe we could have had the home PC 25 years earlier? LOL."

Frank would like to correspond with our anonymous NC contributor. If the *MT* reader will send a sealed envelope to Frank enclosed in a cover envelope addressed to *MT*, we'll be happy to forward it to him again.

Another person impressed with *MT* reader response is John Musgrave of Oona River, BC, Canada. He submitted the pictures of loop antennas which were identified by readers in the June 2002 issue. He says, "Well, now we know all about Terion antennas. My friends in Oona will be most impressed that with a 'little' help I manage to release so much info. Terion are at least paying the rent on their Oona site and say 'they will be hooking up computers soon.' Of course, there are no computers there at present."

Meanwhile, did you know that WLO Radio in Mobile, Alabama, uses the Hermes loop in their HF system? Here's a picture of it contributed by Charles Brown N4SO, of Grand Bay, Alabama.



We had hoped to go into more detail in *MT* on how the loop antenna systems work, based on diagrams sent to us by Richard McClung, but it doesn't really explain the antennas. Would anyone like to undertake the challenge? Or, how about a feature on WLO communications?

Happy holidays and merry monitoring to all our terrific readers; you guys and gals are the greatest!

— Rachel Baughn,
editor@monitoringtimes.com

We welcome your ideas, opinions, corrections, and additions in this column. Please mail to *Letters to the Editor*, 7540 Highway 64 West, Brasstown, NC 28902, or email editor@monitoringtimes.com. Letters may be edited for length and clarity. Happy monitoring!

— Rachel Baughn, KE4OPD, editor

Radio Honor Roll

Rami Mahamid, 18

This Israeli Arab teenager was waiting for the bus in Northern Israel when a man with a large bag approached the bus stop. Something about him made Rami suspicious. He asked to borrow the man's mobile phone, then used it to call the police and whisper a warning. He returned the phone to the man and sat beside him, trying not to appear nervous. When the police arrived, the bomber blew himself up. Rami underwent surgery for cuts on his face and neck, but was kept tied to his hospital bed for five days because the police believed he was an accomplice. When he was at last cleared, he was given a certificate of thanks. Rami said, "I'm an Israeli citizen and also an Arab, but I acted as a human being in that moment. I hate to see innocent people killed."

Direction-Finding can be Dangerous

To reinforce the cautionary warnings in this month's feature story on tracking the burrowing owl, we received a newspaper clipping about a wildlife researcher mauled by a black bear last summer. The 24-year-old was tracking woodcocks fitted with radio transmitters in the Four Brooks Wildlife Management Area in central Minnesota. He was treated for broken facial bones, puncture wounds, lacerations, and a broken leg. Though such attacks are very rare, caution is advised.

Commando Solo Leads the Way

In plans outlined last August, high technology will play a large part in bombarding Baghdad — and not just with sophisticated weaponry. Strategies include using newly-developed electromagnetic pulse weapons along with more traditional bombs to disable Iraqi communications. The empty Iraqi airwaves would then be bombarded with messages sent from the specialized Commando Solo aircraft used most recently in Afghanistan — warning troops to stay in their barracks or be slaughtered, and promising Iraqi commanders that if they use biological or chemical weapons, they will be hunted down. "The idea is ... to isolate the Iraqi leadership who are hiding in [the] bunkers," John Pike of the think tank GlobalSecurity.org told the *Post*.

Put MARS to Work for the Holidays

The holiday season offers plenty of opportunity for good deeds by hams in general, members of the Military Affiliate Radio System in particular, and anyone wanting to support servicemen away from home. For U.S. servicemen away from home, access to free MARSgrams and phone patches is available to their families. "Any servicemember" messages will also be delivered to selected bases overseas. There's a new, growing program to initiate greetings addressed to "any veteran" at participating Veterans Affairs institu-

tions, bringing recognition and hope to the 100,000 hospitalized veterans who may not have family or friends nearby during the holiday season.

For a lot of people, the simplest way to send a MARSgram is to connect to the Army MARS web page, <http://www.asc.army.mil/mars>, click on "MARSgrams" in the left hand column, and follow instructions. Or hams can forward them to any MARS member for relay. Each message must include the full military address and, if available, the phone number of the addressee.

The "any servicemember" message is a nice gesture—a sort of grown-up pen pal arrangement. Your MARSgram will be delivered to a participating installation or organization for handing on to a man or woman in uniform. An "any servicemember" MARSgram may be mailed to: USO Regional Office Atlantic, ATTN: Any US Servicemember, Unit 29623, APO, AE 09096 USA.

MARS asks that individual MARSgrams be limited to 50 words each. There is not an official limit on the number of MARSgrams a person can send.

— via Bill Sexton

Part of the Problem is People

Much has been made of the communications equipment problems that hindered effective response to the September 11 attacks of 2001 and undoubtedly contributed to the loss of lives. "Interoperability" has become the catch-word of the day, but it doesn't apply only to equipment.

The comprehensive reports released in August on police and fire department response on 9/11 reveal ongoing organizational difficulties, many of which were also cited following the 1993 trade center bombing. Better adherence to the 30-year-old Incident Command System was high on the list. The report found that the FDNY and NYPD "rarely coordinated command and control functions and rarely exchanged information." The report recommended development of coordinated response procedures, creation of management teams with a single top commander, frequent large-scale drills and terrorism simulations, and, yes, better radios and specialized gear for high-rises.

Two Killed in Tower Collapse

As television stations prepare for the transition to high definition television (HDTV), old towers have to be augmented and new towers have to be constructed. Nebraska's tallest structure was a 1,956-foot TV transmission tower near Scottsbluff — 500 feet taller than the Sears Tower in Chicago — built in the late 1960s for KDUH. It was being strengthened for HDTV equipment when it collapsed, killing two workers and injuring three others. The cause of collapse has not yet been determined. Only 50 feet of the tower remained standing. The tower had seven levels of guy wires including larger ones installed last year.

The tallest structure in the world is the KVLV channel 11 television tower near Fargo, South Dakota. It stands 2,063 and was constructed in 1963.

FCC Chooses IBOC

On October 10, 2002, the Federal Communications Commission issued a *Report and Order* announcing the selection of in-band, on-channel (IBOC) as the technology that will permit AM and FM radio broadcasters to introduce digital operations most efficiently and rapidly. Other technologies that had been considered all required new frequency allocations for digital broadcasting, but no spectrum is currently available. The IBOC system developed by iBiquity Digital Corporation will allow AM and FM stations to commence digital transmissions immediately without new allocations and concurrent with analog signals.

Scott Fybush reported on the very first station in the country to sign on with the system in his *Northeast Radio Watch* (<http://www.fybush.com/nerw.html>): "FCC approval came Thursday, October 10, and when the sun rose over New Jersey the next morning, '710WOR-HD' was on the air, to decidedly mixed reviews. Since receivers for the digital system aren't yet available, the initial reaction came from analog listeners. At least among the trained ears of the medium-wave DX community, the initial reports suggested that WOR's analog audio, constrained by the bandwidth requirements of the digital signal, sounded much thinner than usual. And since the 'in-band, on-channel' system actually utilizes



Dec 1: DX Test

WLCR-1470, Louisville, KY (COL Shepherdsville, KY) will conduct a DX test from 3:00-4:00 am EST. The station's regular programming is EWTN - their slogan is "Louisville's Catholic Radio". IDs will be played in both Morse Code and voice; the IDs will use a 1 kHz tone at 5 wpm sent every 5 minutes. The Morse will be played at 3am. The station will go to full power (750 W) from 2:45am-3:15am (not sure of pattern). (This test is intended to be a repeat of their 10/21/02 test, in which they encountered some difficulties and did not use the power they had planned on.)

Reception reports (*with return postage*) may be sent to: Vince Heuser, WLCR-AM, 3600 Goldsmith Lane, Louisville, KY 40220; E-MAIL: heuser@iglou.com; WEB: <http://www.wlcr.net>. (Arranged for the IRCA CPC)

Dec 1: Mt Clemens, MI

L'Anse Creuse ARC Swap 'n Shop at L'Anse Creuse HS (Exit 236 off I-94 onto Eastbound Metro Pkwy, left on Crocker Blvd, right onto Reimold to last school building); 8 - 2 pm; Adm \$5. 71: 147.08 +, 146.52 Vendors, trunk sales, VE sess (9 AM, Don Olszewski, WA8IZV), refreshments. For information please contact Gregg Crump, KC8PXJ, Box 180072, Utica, MI 48318-0072 or KC8PXJ@ARRL.NET.

Dec 21: Seal Beach, CA

Southern California Area DXers (SCADS) meeting and annual Christmas gathering: Regular meeting about 2pm, then adjourn to the Carousel Diner. Check the SCADS website for updates <http://www.ocnow.com/community/groups/radiocommunications>.

bandwidth from adjacent channels as well, there were immediate reports of significant digital hash as far down the dial as 690 kHz and as far up as 730 kHz."

Until such interference concerns have been resolved, the FCC is allowing digital broadcasting around the clock on FM, but daytime broadcast only on AM. Receivers are not expected to be available until spring 2003, and will likely cost around \$100 more than standard radios.

Ray Briem, N6FFT, Talkradio Legend Retires

"The King of Overnight Radio," Ray Briem, N6FFT, has retired after 27 years of holding court on the late-night airwaves. Briem's last show was on Sunday evening September 28th over Los Angeles radio station KRLA. Briem spent several decades honing the art of late night talk over at KABC radio, and was eventually put on the nationwide ABC radio network. Occasionally his list of late-night topics included ham radio and the radio hobby, including Bob Grove in his guest list years ago.

A. Prose Walker, W4BW, Dies

Former FCC official A. Prose Walker, W4BW, the man some consider the godfather of the so-called "WARC bands" - 30, 17 and 12

meters - died August 8 following a brief illness. He was 92.

Walker, who headed the FCC Amateur and Citizens Division from 1971 until 1975, made the initial proposal for three new amateur allocations at 10, 18 and 24 MHz during an International Amateur Radio Club (4U1ITU) meeting in Geneva in 1972. Later, he organized and chaired the US preparatory committee for the Amateur Service - the Advisory Committee of Amateur Radio - which took the initial steps to turn the idea into reality at the 1979 World Administrative Radio Conference.

Walker's most recent recognition came at Dayton Hamvention 2000, when he was recognized with a special achievement award. Walker did two tours with the FCC and also worked for the National Association of Broadcasters and Collins Radio Company.

Bob Sherman Dies

Longtime monitor Bob Sherman died of cancer September 24 at the age of 63. Bob was a photojournalist, but he also monitored radio scanners for several media outlets, including the *Miami Herald*.

Bob was one of the pioneers of the scanning world, and he monitored almost every major story in the South Florida area for the last 30 years. Bob

also served as the local frequency coordinator during several national political conventions, and he was the security and communications coordinator for The Bee Gees during a nationwide tour in the 1980s.

Bob was at the forefront of the 800 MHz trunking technology and the mapping of new fleets and talkgroups when most hobbyists didn't know what those terms even meant. His home held more than 25 scanners. "He was a very good news man," said Phil Sandlin, a former photo chief for the AP. "He always knew what was going on."

"Communications" is compiled by editor Rachel Baughn from emails and newscippings sent in by our readers. Thanks go to this month's MT reporters: Anonymous, Albany, NY; Sterling Marcher, La Mirada, CA; Maury Midele, Wimberley, TX; Doug Robertson, Oxnard, CA; Brian Rogers, Melvindale, MI; Mike Roth, Chicago, IL; Richard Sklar, Seattle, WA. And via email: Ed Cummings, Maryanne Kehoe, Henry LaViers, John Mayson, Jerry None, Larry Van Horn, Bill Sexton, Danny Siler, Doug Smith, Peter Vieth, John Wilson, Robert Wyman.

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How Repeater Systems Work

By Dan Yemiola AI8O

Figure 1: Simplex

In the simplest of radio systems, called a "simplex" system, each unit communicates directly with other units.

All units use the *same* frequency to transmit and to receive.

Because all the units in a simplex system use the same frequency or channel, the communications are one way at a time.

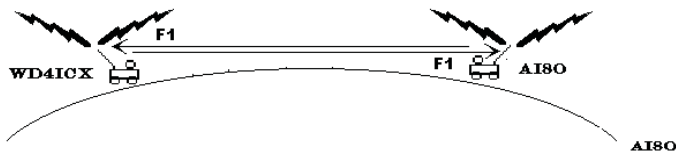


Figure 2: Simplex

A simplex radio system works fine for large, open, flat areas. In cities, suburban areas, and mountainous regions, however, buildings and hills block radio signals, thereby reducing the radio system's effectiveness.

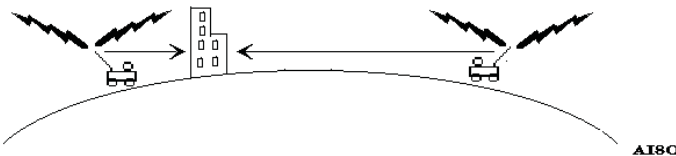


Figure 3: Simplex with Base Station

The first solution to the problem of blocked signals, is to place an antenna on the highest point around – a hill, a tall building, or a radio tower. The radio at the tower is called a "Base Station" and it is connected to the dispatcher's desk "control point" via wires called the "control link."

All units, including the base station, transmit and receive on the same frequency. If two units can't communicate directly, they tell the dispatcher, who then relays the message.

Simplex
Base Station
Wire-line
Control

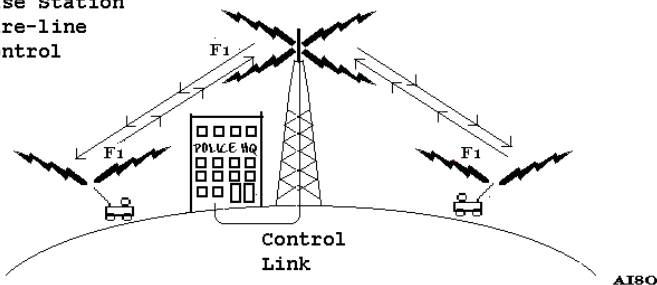


Figure 4: Hemi-Duplex*

Hemi-duplex systems use two different frequencies. The base station transmits on one frequency and the mobiles transmit back on an-

other frequency. The mobile input frequency is *not* rebroadcast.

Hemi-duplex systems are often used by cab companies. When a request for a taxi is phoned in, the dispatcher asks all the available taxi drivers where they are, and gives the trip to the cab that is closest to the phoned-in pick-up point. The mobile input frequency is not repeated so that the taxi drivers cannot hear each other's location, and then lie about their location to get the assignment.

Hemi-Duplex
Wire-line
Control

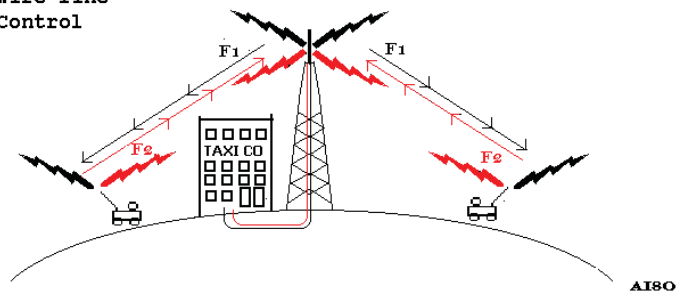


Figure 5: Semi-Duplex

Every time a message is relayed, it tends to get changed or garbled. A way to reduce garbling is to allow two units to communicate directly. One method of establishing direct communications for mobile units that are out of "direct range" is the semi-duplex repeater.

Semi-duplex repeaters are the most common form of radio repeater systems.

A repeater is a radio receiver/transmitter combination. The repeater is often called "the machine" to differentiate it from the other units in the system. The repeater is installed on a hill, a tall building, or a radio tower. The machine automatically *retransmits* the signal it received on one frequency (F1) on another frequency (F2).

The control point at the dispatcher's desk transmits and receives just like a mobile radio. As far as the machine is concerned, it is just another mobile unit.

Semi-Duplex

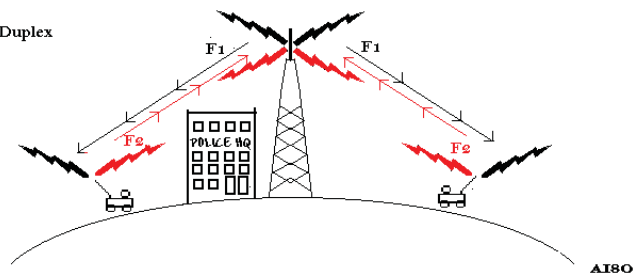


Figure 6: Demi-Duplex

Demi-duplex systems are four frequency systems. They are regular semi-duplex repeaters whose "control links" (F3 and F4) are two radio

frequencies that are different from the mobile input and output channels (F1 and F2).

**Hemi-Duplex
Wire-line
Control**

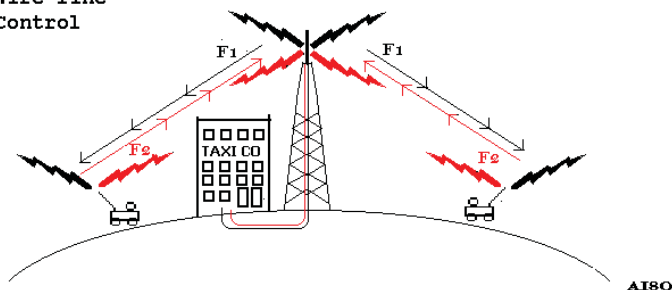


Figure 7: Hemi-Demi-Duplex

Police agencies often need to transmit sensitive or confidential information from the mobile units to the dispatcher without other people hearing the message. Often they reconfigure their demi-duplex repeater systems into *hemi-demi-duplex* systems. When a mobile has confidential information to send, the dispatcher sends coded control signals over control link (F4) that turn off the machine's automatic retransmission on (F1) of the mobile input channel (F2). The control link frequencies (F3 and F4) are then used in the same way as the wire line control links of a hemi-duplex system.

You can tell if a machine is hemi-demi-duplex, if at times you hear a mobile unit saying: "turn off the repeater," and you still hear the dispatcher talking, but not the mobiles. What they are really doing is turning off the mobile output transmitter (F1), while F2, F3, and F4 are still operating.

**Demi-duplex
radio link
Control**

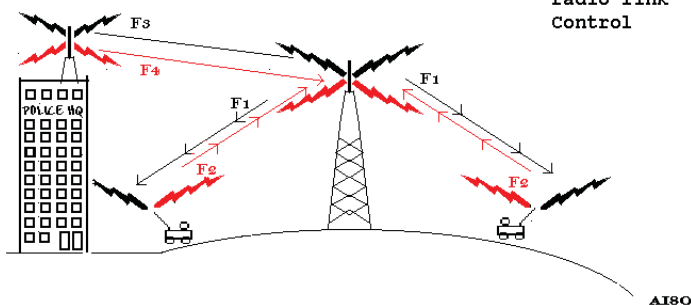


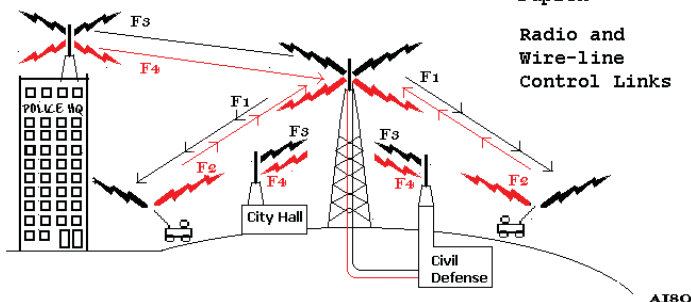
Figure 8: Hemi-Demi-Semi-Duplex

A radio system in a large city may have one or more machines that are hemi-demi-semi-duplex. What this means is that the repeater is a semi-duplex machine that has both wireline and radio control links. In fact, the machine may have several different control points and control links.

For example, the city may have a control point at police HQ, and

**Hemi-Demi-Semi
Duplex**

**Radio and
Wire-line
Control Links**



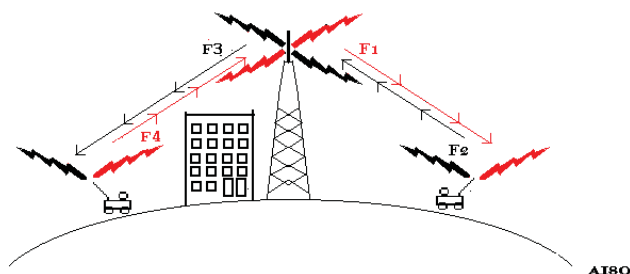
back-up control points at city hall and the city's emergency management center.

Figure 9: Full Duplex

Full duplex repeater systems are the easiest to understand. Cell phone systems operate in this mode.

Every message that is transmitted on (F2) is immediately retransmitted on (F3). Every message that is transmitted on (F1) is immediately retransmitted on (F4). A full duplex system is a true *two-way* radio system.

Full Duplex



** Editor's Note: The author's terms are no longer in popular use, but the systems he describes are valid nonetheless. Just bear in mind that "hemi-" and "demi-" both mean "half," and "semi-" means "partial," so what he is describing are variations on duplex and half-duplex systems.*

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Radio Canada International

"Canada's Voice to the World"

By Bill Bergadano

December 25th brings to mind a number of personal memories connected to that particular date: unwrapping gifts as a kid; getting my first shortwave radio Christmas day, 1974; the Elton John song, *Levon* ("He was born a pauper to a pawn on Christmas Day"), and much more. However, in the annals of international broadcasting, December 25 has a particular meaning; on that date in 1944, the world was introduced to Radio Canada International. And to learn how RCI got to where it is today, let's look at its history.

On Sept. 19, 1942, the Canadian Parliament formally requested the Canadian Broadcasting Corporation (CBC) to build an international service and operate it on behalf of the government. In January 1943, the Prime Minister of Canada, William Lyon MacKenzie King, called for a letter to be written to American president Franklin D. Roosevelt asking for FDR's help in helping Canada secure shortwave radio transmitters for use in World War II. Radio had become just as powerful as the military forces entrenched in combat. Now Canada wanted to enter the radio war!

The Munitions Minister C.D. Howe, however, was not so open to FDR's intervention, stating that "shortwave transmitters were not a priority" for him, and his views stopped the request from going to Washington. Howe believed in "hard" weapons and not soft talk. He quoted Churchill in support – "if words could kill, we would all be dead." For another two years Howe was a roadblock in the face of mounting British pressure for Canada to have a shortwave radio service. The authorization of an international service came just as it looked bleak in the war effort for the Allies, with Canada suffering two major setbacks, including a failed raid at Dieppe.

By the time the Canadian shortwave service took to the air, France was largely liberated and the allied forces seemed headed to victory, yet many rough times were ahead. RCI soon found itself entrenched in psychological warfare in an effort to hasten the surrender of Germany, while bolstering the spirits of those in occupied nations. Following Germany's surrender, Canada's principal aim in its German-lan-

guage programs was to counter the Nazi way of life in countries that had been under Germany's grip during the war.

The station, originally known as the International Service of the CBC, didn't actually acquire the name Radio Canada International until a few years later. But by 1972, it was the loudest voice into Europe from North America. Its 50 kW transmitters in Sackville, New Brunswick, used a custom-designed, highly sophisticated antenna system which made its signal more powerful than the Voice of America!

Historical impact

One of the most dramatic events in world history involving shortwave broadcasting occurred during the ill-fated coup against President Gorbachev in the former Soviet Union. Gorbachev mentioned staying well informed due to broadcasts by the BBC, Radio Liberty and the VOA. What he failed to note were the Russian language programs of RCI that were relayed over the BBC; perhaps he wasn't even aware he was tuned to RCI! Nevertheless, at that time, no other broadcaster penetrated the Soviet Union from so many directions. During the crisis, it was not only Gorbachev who brought out the shortwave radio to find out what was happening in his own country, but millions of his fellow citizens were doing the very same thing. To meet the demand for information, RCI doubled its transmissions in Russian and Ukrainian.

RCI became a major voice in the international arena – more than was generally realized in

Canada. Lech Walesa of Poland credited RCI among other Western broadcasters as a factor in the demise of the Soviet Union. Before the defeat of communism, RCI was listed by many European refugees and travelers as one of the leading stations which commanded their attention and respect. Audience research conducted in the late 1980s found the audience to number between 12 and 16 million listeners weekly. 50,000 letters a years flowed into Montreal, some from the most obscure places, praising RCI.

A waning presence

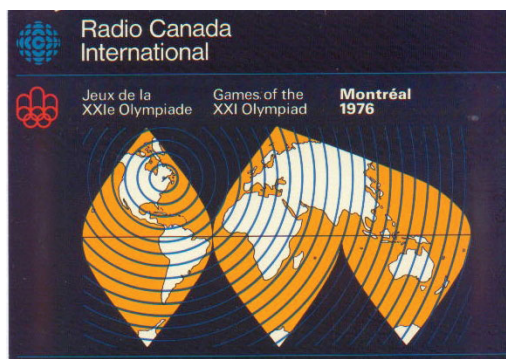
Recent years, however, found neither the CBC nor the External Affairs Department attaching priority to an external broadcasting service. In fact, in the early 1990s with a recession underway, the CBC sought to close RCI, and nary a whimper of protest came from the Department of External Affairs. RCI fought back, and survived, thanks in part to the many letters of protest the CBC and External Affairs Minister received.

The reprieve was short-lived. On April 1, 1991, Executive Director of RCI Allan Familiant sent a message to millions of listeners abroad stating, "due to reduced budget provided by the Government of Canada, our programming was severely curtailed." Though the date was April Fools day, this was no joke: the once powerful RCI was suddenly a whisper. Services in Polish, Czech, Slovak, German, Japanese and Portuguese were discontinued to the shock of listeners in far flung areas of the world.

To maintain its presence on the international radio spectrum, RCI began to relay the French and English networks of the CBC. Yet the cuts of 1991 were repeated in 1995, 1996, and recently again in 2000.

To the rescue

Hard times have befallen this once stable broadcaster. Although broadcasts in Russian, for example, have resumed, RCI still relies on the vocal support of its listeners. Many have stated that the citizens of Canada don't know what a valuable service the station provides, but it's not only the citizens who are ignorant



of RCI. A former CBC President, Al Johnson, didn't even know that RCI existed! Another CBC President, Pierre Juneau, was said to have RCI on the top of the list for budget cuts whenever he had to save a dollar or two. Yet, when he left his position with the CBC he was only full of praise for RCI and how well it did on such a paltry budget.

Director Familiant eventually moved to rebuild the once mighty voice of Canada, ordering RCI to have at least a semblance of English and French programming. English and French news were then translated for the five language services.

One factor in this turn-around could be English language lessons. A few years ago, RCI was the first station to find itself on stations throughout China, with a 40 part series of English language lessons, accompanied by textbooks for the course. The service was only on 30 minutes a week, but it was wildly popular! The book for the course soon became difficult to find, even when reprinted. The demand and enthusiasm for the broadcasts made the CBC take notice. Suddenly millions of residents of China were speaking English – with a Canadian accent! Canada was once again coming to the attention of millions of people; its culture, geography, science, and industry were being introduced to a new group of listeners. When even more English lessons were introduced in 1994, no one in China would have thought learning English could be so much fun!

The scene today

Radio Canada International now broadcasts in some seven languages, including English and French. The service still puts out an incredibly strong signal in Europe, not only with its broadcast transmitters in New Brunswick, but through its strategically placed relays around the world: South Korea, Austria, Portugal, England, Germany, China, Japan, and the UAE.

RCI also provides relays for other stations from around the world. Radio Japan has been relayed over RCI for over a decade now. Radio Korea is able to have new listeners to its English Service thanks to RCI. At first, anyone wishing to listen to RCI's relay had to rise before dawn to hear Korea at 1130 UTC, but in late 2001 RCI began relaying Seoul at the more manageable hour of 0200 on 9560 kHz.

The station made some other important changes in 2001. When the BBC World Service stopped broadcasts to North America and the Pacific via shortwave, RCI began using vacated BBC relay frequencies to relay Radio Netherlands. It also rebroadcast some popular CBC programs, such as *World At Six*, now on 11865 kHz.

Final thoughts

When I think of Radio Canada International, I think of a warm voice that comes to me over the radio – a reflection of the friendly demeanor of the Canadian populace. Especially on September 11, 2001, after the devastation that the US experienced with the attacks on the World Trade Center and the Pentagon, I found a calm, reassuring, and objective voice as I listened to the RCI. And I will continue to listen – just as I did way back on a borrowed shortwave portable radio in late 1974 – to Canada's "Voice to the World."

Radio Canada International

Fall/Winter Broadcast Schedule

UTC	Language	Frequency	Targets	kW	Azimuth
0000-0057	English	XIA 11895	S.E.Asia/China	120	188
		KIM 9755		100	225
0000-0059	French	RCI 9755	USA/Carib./LatAm.	100	212
		RCI 11865		250	178
		RCI 13640		250	240
0130-0159	Spanish	RCI 9590	USA/Carib./LatAm	250	176
		RCI 9755		100	240
		RCI 11865		250	189
0200-0259	English	RCI 6040	USA/Carib./LatAm	100	268
		RCI 9755		100	240
		RCI 11725		250	176
0200-0257	English	XIA 15150	India	120	258
		XIA 17860		120	258
0330-0359	Arabic	WER 6025	Middle East	500	120
		WER 9615		500	120
		VIE 11845		100	115
0430-0459	Arabic	WER 9505	Middle East	500	120
		WER 11815		500	120
		vie 11955		100	115
1200-1259	French	RCI 11805	SE US/Carib	250	212
		RCI 13655	SE US/Carib	250	240
1200-1259	English	YAM 9660	SE Asia/China	100	270
		YAM 11730		300	235
1300-1329	Chinese	YAM 9660	China	100	270
		KIM 9810		250	270
		YAM 11730		300	235
1300-1559	English	RCI 9515	US/Caribbean	250	212
		RCI 13655		250	240
		RCI 17710		100	227
1400-1659	English	RCI 9515	US/Caribbean	250	212
		RCI 13655		250	240
		RCI 17710		100	227
1430-1459	Chinese	YAM 5985	China	100	290
		YAM 9560		300	270
		KIM 9810		250	290
1500-1557	English	XIA 15360	India	120	258
		XIA 17820		120	258
1600-1629	Russian	MSK 7430	Russia	250	84
		HBV 9555		500	85
		WER 11935		300	75
		RMP 13850		600	61
1630-1659	Ukrainian	WOF 9555	Ukraine	250	84
		SKN 11935		300	90
1700-1759	French	RCI 17820	US/Carib	250	227
		RCI 21565		250	240e
1700-1729	Russian	VIE 9555	Russia	100	85
		WER 11935		300	90
		RMP 13650		500	78
1730-1759	Ukrainian	WOF 9555	Ukraine	250	78
		SKN 11935		300	90c

2000-2059	French	SKN 7235	Europe/Africa	300	180
		RCI 9770		100	60
		FLE 11725		500	180
		RCI 13850		250	60
		RCI 15325		250	105
2015-2044	Arabic	SKN 5995	Middle East/North Africa	300	110
		WER 9615		500	180
		HBV 11600		350	140
		RCI 12015		250	73
		UB Local			
2100-2159	English	HBV 5850	Europe/Africa/Middle East	300	140
		SKN 5995		300	180
		SKN 7235		300	110
		ARM 7425		100	188
		RCI 9770		250	60
		DHA 9805		250	230
		RCI 13650		250	105
2200-2229	English	HBV 5850	Europe/NW Africa/ Mid-East	350	140
		SKN 6045		300	180
		RCI 9770		250	60
		FLE 9805		500	191
2215-2244	Arabic	RMC 1233	Moyen-Orient		
		WV Europe/NW Africa			
2230-2259	French	HBV 5850		350	140
		SKN 6045		300	180
		RCI 9770		250	60
		FLE 9805		500	191
		RCI 12015		250	105
2230-2359	French	RCI 9755	E. US/Carib/LAm	250	212
		RCI 11865		250	178
2300-2329	English	RCI 5960	E US/Carib/LAm	250	240
		RCI 9590		250	240
		RCI 11865		250	176
2300-2329	Chinese	KIM 6180	China	100	305
		YAM 9680		300	290
		YAM 11705		300	240
		SNG 13735		100	13
2330-0059	English	RCI 5960	E&C US	250	240
		RCI 9590		250	240
2330-2359	Spanish	RCI 9755	Carib/LAm	50	212
		RCI 11865		250	176
		RCI 13730		250	176

Transmitter Sites:

ARM: Armavir Relay, Russia
DHA: Dhabayya Relay, United Arab Emirates
FLE: Flevo Relay, The Netherlands
HBV: Hoerby Relay, Sweden
KIM: Kimjae Relay, Korea
LIB: Radio Liban, Lebanon
MEY: Meyerton Relay, S Africa
MSK: Moscow Relay, Russia
RCI: Sackville, NB, Canada
RMC: Radio Monte Carlo
RMP: Rampisham, England
SIN: Sines, Portugal
SKN: Skelton Relay, England
SNG: Singapore Relay, Singapore
VIE: Vienna Relay, Austria
WER: Wertachtal Relay, Germany
XIA: Xian Relay, China
YAM: Yamata Relay, Japan

Radio Canada International
POICP 6000
Montreal, Canada H3C 3AB
rci@montreal.radio-canada.ca

Use Your Scanner to Track Wildlife

Story and Photos by Joe Moell KOOV

On a mobile hidden transmitter hunt about twenty years ago, I pulled my car into a scenic lookout on California Highway 1. There was a beautiful sunset out over the Pacific Ocean, as waves crashed into the rocky shoreline below. Two vehicles down, I noticed a large van with a five-element Yagi antenna on top.

Hmmm, I don't recognize this van. I didn't see it at the hunt starting point. And the beam is pointed out to sea.

My curiosity got the best of me and I soon discovered that the driver was also doing radio direction finding (RDF), but with a much different mission. He was logging sig-

nals from radio-collared sea otters as part of a research study for a midwestern university.

This naturalist was reluctant to show me his gear, perhaps because I would learn the frequencies of his radio tags. That made me even more curious. When I got home, I started researching the equipment used for this kind of radio tracking, thinking it might be useful for competitive ham radio transmitter hunting. But few researchers or equipment manufacturers were willing to talk. Apparently there was great concern that hunters and poachers would make use of such information in ways that would be detrimental to their efforts.

Today there's just as much radio tracking of wildlife, but the attitude is much different. Almost every week I see programs on cable TV featuring RDF for conservation and preservation. Biologists daily plot the exact location of critters from mouse-size to moose-size, on land, sea, and air. Some work directly for educational institutions, while others are independent consultants. Most of them want average citizens to know what they're doing and to support their efforts.

Ticking Tortoise Transmitters

In the Mojave desert of California, the tortoise population is dwindling. As the number of ravens increases, so does their preda-

tion on tortoise eggs and young. All too often, they are struck and killed as they slowly cross desert highways. Development, off-road vehicle use and livestock raising all contribute to the threat. After a sudden decrease in population twenty years ago, the US Fish and Wildlife Service listed this species as threatened.

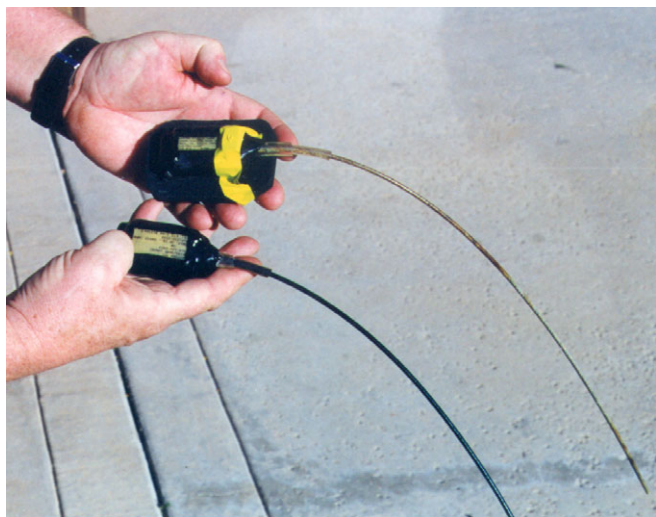
Wildlife management agencies couldn't do much about the egg-loving birds, but they erected low hardware-cloth fences and built tunnels to guide small animals safely under the roads. To determine the effectiveness of these measures, the National Biological Survey commissioned a detailed study. Approximately fifty tortoises were radio-tagged and three researchers have kept track of their movements.



A University of Oregon researcher uses an infrared "peeper" camera on the end of a flexible shaft to observe owl hatchlings deep in a burrow. She is about to cover her head so that she can better see the video monitor on her goggles.



Burrowing Owls blend in well with their surroundings. The author discovered this one standing guard along the banks of an irrigation canal near El Centro, California.



To get higher power and longer life, the battery size and weight of radio tags must increase. Transmitters like these are too heavy for Burrowing Owls, but are just right for larger waterfowl, such as pelicans.

Tags for this study are made by AVM Instrument Company. Adult tortoises can easily carry one AA-size lithium battery, by far the largest and heaviest component in the tags, which are epoxied directly to the carapace (shell). Transmitters are pulsed for a millisecond at a time to conserve these batteries. Weak short-pulsed signals are not suited to spread spectrum or doppler technology, so sensitive narrowband receivers and high-gain beam antennas are still the RDF method of choice.

Epoxying a whip antenna to the carapace for its full length would interfere with the animal's growth. Instead, researchers glue sections of tubing to the center of the scutes (plates) on the carapace, with the antenna wire inside the tubing. As growth occurs between the scutes, the antenna slides within the tubing.

AVM and other manufacturers offer narrowband synthesized receivers designed for researchers, but this financially-challenged trio has had just as good results with less expensive consumer VHF sets with a BFO for SSB/CW detection, including the Trident TR2400 and Sony ICF-PRO80. They are smaller and lighter than the special receivers, too. An advantage over tunable receivers is that memory channel numbers can be the same as tortoise log numbers, for rapid identification.

For field tracking, most researchers prefer two-element phased dipole antennas, such as the ones sold by Telonics, Incorporated. Hams will recognize this design as the "HB5CV" beam. It has a classic cardioid (heart-shaped) directional pattern. When searching on foot for a tortoise in the open, maximum range is about 3/4 mile. No S-meter is needed because signal level is easily determined by ear in the SSB/CW mode.

There are the usual VHF signal reflections from terrain and objects, but researchers know that they will follow a more-or-less direct path to the tortoise if they keep moving and follow their bearings. According to

one of them, "The hardest part of tracking is getting to a place where you can hear the signal. The rest is relatively easy. We tried triangulating with multiple fixed-site receivers, but the big problem was that not enough of the receivers could pick up the weak signals."

To acquire signals at greater range, the crew has a long Yagi mounted on a mast at the rear of their truck. RDF with small aircraft is also done on occasion. "We use two directional antennas, attached to each wing strut, and a selector switch for left, right, or both," he says. "We fly a pattern and switch the antennas from

left to right and back to zero in."

Eavesdropping on Elusive Owls

Tortoise researchers have it easy because their RDF targets don't travel very far or very fast. Migrating birds are much more difficult to study after they leave the nest, because they travel long distances in short periods. Argos satellite tracking has been a boon to biologists studying very large birds, such as the Sandhill Crane and Harpy Eagle. But it takes at least a half watt to get a signal to the satellite. Government regulations require researchers to use tag transmitters that are only 3 to 5% of a bird's weight.

At 20 to 30 grams, Argos transmitters are too big and heavy to be put on most small birds, mammals, and reptiles, so these species must be tracked directly from the ground or aircraft. This was the dilemma facing researchers from Environment Canada, who needed to know what was happening to Burrowing Owls that hatched on the plains of Saskatchewan and Alberta every summer. Where did they go and why did so few return? Surveys showed a contraction in range and a steady reduction in numbers of about 16% per year from about 3000 pairs in the late 1970s to fewer than 1000 pairs currently. A similar trend has been noted in the US.

Unlike other owls, it's unusual to see a Burrowing Owl in a tree. They prefer to take over abandoned badger or ground squirrel burrows in treeless grasslands. By day, they stand at a burrow entrance, ready to duck inside when necessary to avoid predators such as hawks. At night, they take flight to feed

on small snakes, lizards, and rodents. They fly in an undulating pattern and sometimes hover in the air to catch grasshoppers, beetles and other insects. Burrowing Owls don't hoot, but they emit loud cries as they fly at night. If you disturb one in its burrow, it may try to scare you away by mimicking a rattle-snake.

The Canadians needed to know where these owls went after they left every September and October. They put 6-gram radio tags on a dozen juvenile owls and attempted to follow some of them in a light plane. The weather turned bad, grounding the plane but not the birds, and they all got away. Except for one banded bird carcass recovered in Texas, they had no clues.

That's where monitoring enthusiasts like us come in. We're almost everywhere and most of us already have suitable equipment. We can listen regularly for days and weeks at a time, letting the animals come to us. Ham radio and monitoring publications, including *Monitoring Times*, first put out the word in 1998. Dozens of volunteers in central and southern states carefully tuned the 172 MHz region for weak pulsed signals during fall and spring migration periods. Others, such as "Cactus Charlie" Hoffman K5SBU, opened their ranch lands to the researchers for this and similar studies. Signals thought to be from owl tags were heard and recorded, but no owls were verified.

Success finally came in January 2001, as two biologists from Environment Canada flew a Cessna aircraft more than 9000 miles over the Gulf Coast lowlands and central Mexico. Two signals were heard and later verified on the ground by a pair of Canadian graduate students. One transmitter was under a tree in an orange grove on the side of a small volcanic hill in northern Veracruz state. The ground nearby was littered with owl feathers, indicating that the tag-wearing owl had been killed and plucked by a predator.

The second transmitter was 250 miles southwest of the first. It was still attached to a live adult male owl that had been banded on the grassy plains of southern Alberta. It and several other owls were in a patch of cactus-



A researcher uses a Sony multimode receiver and attenuator to track pulsed signals from tags on desert tortoises in California.



At a peak power level of about 1 milliwatt, pulsed 70 times a minute, the tag on this tortoise will stay on the air for up to two years. The entire package weighs 35 grams and is encapsulated with a desert-proof coating.

thorn shrubland on a hillside surrounded by cornfields and pasture in northern Michoacan, just south of Guanajuato. The tagged owl had traveled 2175 miles from the location where it was banded six months before.

Although it wasn't a volunteer monitor who found the birds in Mexico, researchers were impressed that we had weak-signal reception capability and dedication to their project. Soon afterward, a researcher from the Ned Smith Center for Nature and Art asked for help in tracking a few Saw-whet Owls leaving a sanctuary near Reading, Pennsylvania.

This winter, there aren't any tagged Canadian Burrowing Owls or east-coast Saw-whets, but a researcher at the College of Agriculture and Life Sciences at University of Arizona seeks volunteer help to locate the winter homes of 53 Burrowing Owls tagged in eastern Washington State. Frequencies are in the 150-152 MHz range. Nobody knows where they end up, but the main search area is southwest of an imaginary line from Kalispell, Montana, to New Orleans.

You Could Help

Tracking wildlife with RDF is very different from mobiling in search of a hidden transmitter. Most ham radio clubs have strict foxhunting rules that establish a boundary within which the "hidden T" must be located. Usually it must be stationary and have a fixed antenna orientation. Transmission lengths range from several seconds to continuous. The signal must be copyable at the hunt's starting point or through the local repeater.

None of these rules apply to wildlife tracking. There is no guarantee that you will hear a signal when you start. Animals are free to roam as you track them. They change an-

tenna position with every step or hop. Battery size limits transmission lengths to a fraction of a second.

Transmissions occur only about once per second, so you can't just use the SCAN mode in a typical scanner to search for them. You must slowly step through the frequencies with the squelch open, listening through the noise for the "blip ... blip ... blip" (momentary quieting) of the pulses in the FM mode or a momentary chirp in SSB or CW mode. Tag frequencies are often grouped very closely, which may present problems with typical 5 kHz channel spacing of typical FM-only scanners.

Monitoring is only half of the task. Once heard, signals must be positively identified for the data to be of use. Most animal transmitters don't send any "station ID." That pulsed signal you hear on your receiver might be an owl tag, but it could be on a completely different animal. Unfortunately, there's no national registry of wildlife tracking projects and their frequencies.

Many local, state and federal agencies use radio tags. For instance, cougars are collared and monitored in the California county where I live. Occasionally they wander down from the mountains into city parks and backyards, where they have killed pets and mauled children. Needless to say, officials want advance warning of their visits whenever possible, so they regularly check their whereabouts. Never forget that many other researchers use VHF radio tags, and you might be tracking something much larger and more dangerous than an owl!

If you have a directional antenna and want to attempt to pinpoint the exact location of a radio-tagged owl, that's great. But keep in mind that these birds must be treated with respect if they are to survive. Observe

them only from a distance with binoculars or a spotting scope. Do not disturb them or their burrows.

If you spot a radio-tagged bird, please observe closely with binoculars to determine if it is banded, plus the band colors and band number, if possible. Note the date, time, exact frequency, your location, and any other distinctive signal characteristics. Make tape recordings or digital audio files if you can. Notify the researchers as soon as possible, using the addresses at my Web site. Contact the birding enthusiasts in your area and your local Audubon Society for more information on observation techniques and birdwatching etiquette.

My Web site <http://www.homingin.com> has the latest details of the Burrowing Owl Project, including all of the active frequencies, equipment suggestions for monitoring and RDF, plus what to do if you hear a probable tag signal. To rapidly spread the word whenever signals are heard, there is a Biotrackers Internet mailing list. To subscribe, send a blank e-mail to biotrackers-subscribe@yahoogroups.com with "subscribe" in subject and body. Thanks for your help!

About the Author

Joe Moell, K0OV is an electronic engineer who has been on hundreds of ham radio transmitter hunts and recently discovered the fun of tracking critters on "Mother Nature's no-rules/no-boundaries hunts." He is co-author of the book *Transmitter Hunting - Radio Direction Finding Simplified* (published by TAB/McGraw-Hill) and has written over 160 articles on the subject. His e-mail address is k0ov@homingin.com

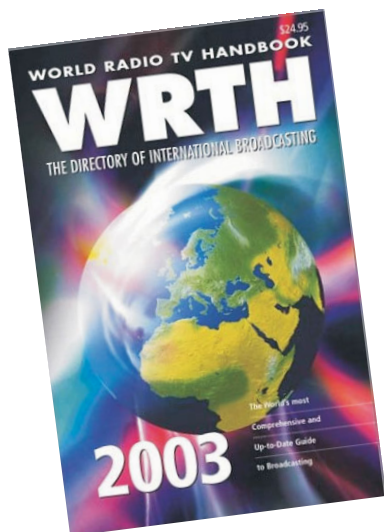
Table 1 - Washington State Burrowing Owl Tag Frequencies, Fall/Winter 2002

(All frequencies MHz)

150.006	150.859	151.449
150.038	150.878	151.541
150.098	150.901	151.580
150.149	150.942	151.599
150.173	150.961	151.619
150.217	151.040	151.639
150.284	151.117	151.658
150.329	151.146	151.680
150.350	151.157	151.711
150.360	151.180	151.721
150.390	151.199	151.758
150.439	151.238	151.822
150.668	151.261	151.842
150.670	151.268	151.862
150.679	151.392	151.879
150.697	151.412	151.899
150.701	151.430	151.919
150.842	151.432	

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The Monitoring Times Guide to Scanning APCO P-25 Systems

By Dan Veeneman

One of the most significant changes in the scanning hobby since the introduction of the original trunk-tracking radios is taking place right now as new digital-capable scanners hit the market. Uniden is the first to sell scanners that have the ability to monitor public safety and other radio systems that use the APCO Project 25 (P-25) suite of standards. The standards grew out of work by the Association of Public-Safety Communications Officers and have since become a popular choice for new police, fire, and other agency radio systems. Background on Project 25 can be found in my June 2000 *Tracking the Trunks* column.

With the introduction of these new P-25 scanners it will become important to know where to look for digital systems. The following list contains identification and frequency information for many known P-25 systems. Listings are sorted by state, and then by the organization name within the state. Each organization will have one or more transmitter locations. Each location will transmit on one or more frequencies.

Remember that Project 25 is a set of standards, some mandatory and many optional. Most system designers have chosen to use only

a few of the available standards. Here are some brief notes about the differences that you may encounter when scanning.

All P-25 systems use the same protocols over the air, called the *Common Air Interface* (CAI). An APCO-25 compatible scanner will be able to understand a system that uses this standard. It will not understand AEGIS or other digital systems that do not use the P-25 CAI.

Voice traffic may be digital only, or a mix of analog and digital. Digital voice may be encoded using one of two methods: either IMBE (Improved Multi-Band Excitation) or VSELP (Vector Sum Excited Linear Predictive). IMBE is the Project 25 standard, which you should be able to hear (if it is not encrypted). VSELP is a Motorola proprietary scheme and is not supported by any consumer scanner. Cleveland is an example of a city that uses P-25 CAI and digital voice, but because they use VSELP voice coding the voice traffic cannot be heard.

Regardless of the encoding method, digital voice may either be encrypted or unencrypted. (Remember that encoding and encryption are not the same thing!) There are different types of encryption, but for the scanner listener it is irrel-

evant since the end result is unintelligible audio.

Frequencies in a P-25 system may either be part of a trunking group or may be conventional (non-trunked). If they are trunked, the control channel for the trunking group may run at either 3600 baud or 9600 baud. The 3600-baud control channel is used in systems with older radios that cannot handle the higher speed. The 9600-baud channels will be found in newer systems that are completely digital. Preliminary reports indicate that the new Uniden scanners will not be able to trunk-track 9600-baud systems, so users will have to scan those as they would a conventional system.

One final note: there are many more systems out there than we have room to print, even in two or three installments. This list, along with updates and additions, will be maintained on my website at <http://www.signalharbor.com>, so check there for the latest information. If you have details about a particular system (such as talk groups), or have found one that isn't on the list, please send the details via electronic mail to danveeneman@monitoringtimes.com or write to me in care of this magazine.

ALABAMA

CALHOUN COUNTY

Call Sign WPLU566, Granted 02/20/1998.

PIEDMONT (CALHOUN COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

HEFLIN (CALHOUN COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

SYLACAUGA (TALLADEGA COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

RENFROE (TALLADEGA COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

ANNISTON (CALHOUN COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

JACKSONVILLE (CALHOUN COUNTY), ALABAMA

866.0125, 866.0500, 866.0750, 866.3000, 866.5125, 866.5750, 866.8750, 867.1875, 867.6750, 867.7000, 867.7500, 868.1625, 868.6125, 868.8625 MHz

Call Sign WPME714, Granted 06/22/1998.

ANNISTON (CALHOUN COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

JACKSONVILLE (CALHOUN COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

PIEDMONT (CALHOUN COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

HEFLIN (CALHOUN COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

SYLACAUGA (TALLADEGA COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

TALLADEGA (TALLADEGA COUNTY), ALABAMA

855.7125, 856.2625, 859.2625, 859.7625, 859.9375, 860.2625, 860.7625, 860.9375 MHz

OPELIKA

Call Sign WPHR813, Granted 06/13/2000.

OPELIKA (LEE COUNTY), ALABAMA

855.4625, 855.7375, 855.9625, 856.2125, 856.4875, 856.7375, 857.2125, 857.4875, 857.9625, 858.2125, 858.4875, 858.7375, 858.9375, 859.2125, 859.4625, 859.7375, 859.9375, 860.2125, 860.4875, 860.7625 MHz

ARIZONA

MARICOPA COUNTY

Call Sign KNH427, Granted 02/03/1998.

PHOENIX (MARICOPA COUNTY), ARIZONA

855.9875, 856.2375, 857.2375, 857.2625, 858.2625, 859.2625, 860.2625 MHz

SCOTTSDALE (MARICOPA COUNTY), ARIZONA

857.2625, 859.2625, 860.2625 MHz

Call Sign KNNN305, Granted 04/06/2001.

PHOENIX (MARICOPA COUNTY), ARIZONA

866.5625, 867.1625, 867.3625, 867.7625, 867.8625 MHz

CAREFREE (MARICOPA COUNTY), ARIZONA

866.2375, 867.8250, 868.8250 MHz

MESA (MARICOPA COUNTY), ARIZONA

866.1625, 868.8625, 868.8875 MHz

AGUILA (LA PAZ COUNTY), ARIZONA

866.1500, 867.1500, 867.8125 MHz

CROWN KING (YAVAPAI COUNTY), ARIZONA

866.2125, 867.1750, 867.7250, 868.8125, 868.9375 MHz

CHANDLER (MARICOPA COUNTY), ARIZONA

866.1875, 867.3000, 868.9000 MHz

Call Sign KNNN306, Granted 02/08/2001.

SCOTTSDALE (MARICOPA COUNTY), ARIZONA

866.1500, 866.2000, 866.2500, 867.1500, 867.2125, 867.2875, 867.7500, 867.8125, 868.6500, 868.8000, 868.8500 MHz

LITCHFIELD PARK (MARICOPA COUNTY), ARIZONA

866.0125, 866.1250, 866.2250, 867.1375, 867.1875, 867.2375, 867.4375, 867.7375, 867.8375, 868.0375, 868.1375, 868.5375, 868.7750, 868.8750, 868.9250 MHz

YARNELL (YAVAPAI COUNTY), ARIZONA

866.0125, 866.1750, 867.3125, 867.6750, 867.9125, 868.6750 MHz

GILA BEND (MARICOPA COUNTY), ARIZONA

866.0125, 866.5625, 867.1625, 867.3625, 867.7625, 867.8625 MHz

APACHE JUNCTION (MARICOPA COUNTY), ARIZONA

867.3125, 867.9125, 868.9500 MHz

SUNFLOWER (MARICOPA COUNTY), ARIZONA

866.1750, 867.6750, 868.6750 MHz

Call Sign WNM2858, Granted 03/08/2000.

SCOTTSDALE (MARICOPA COUNTY), ARIZONA

851.3375, 852.7125, 853.3625, 853.5625, 853.7625, 854.3375, 854.5875, 857.7625, 857.8625, 858.7625, 859.7625, 860.7625, 860.9625 MHz

SCOTTSDALE (MARICOPA COUNTY), ARIZONA

857.7625, 860.9625 MHz

SCOTTSDALE (MARICOPA COUNTY), ARIZONA

857.7625, 860.9625 MHz

TUCSON

Call Sign WPOA524, Granted 04/20/2000.

TUCSON (PIMA COUNTY), ARIZONA

866.0750, 866.1375, 866.1625, 866.1875, 866.2125, 866.2375, 866.3125, 866.4375, 866.5625, 866.5875, 866.6125, 866.6750, 866.8125, 866.8625, 866.9250, 866.9500, 867.1000, 867.1250, 867.2000, 867.2250, 867.3500, 867.3750, 867.4500, 867.8500, 867.8750, 867.9250, 868.1500, 868.1750, 868.2000, 868.2875, 868.3125, 868.3750, 868.4250, 868.4500, 868.5375, 868.6250, 868.6500, 868.6750, 868.7125, 868.7375, 868.7875, 868.8500, 868.8750, 868.9000, 868.9250 MHz

CALIFORNIA

ORANGE COUNTY

Call Sign WNIB734, Granted 01/18/2002.

MODJESKA (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WNIB735, Granted 01/19/1999.

SANTA ANA (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WNSS311, Granted 04/09/1999.

ORANGE (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1500, 866.1750, 866.3750, 866.4000, 866.6250, 866.6500, 866.6750, 866.8750, 866.9000, 867.1250, 867.1500, 867.1750, 867.3750, 867.4000, 867.6250, 867.6500, 867.6750, 867.8250, 867.8750, 867.9000, 868.1250, 868.1500, 868.1750, 868.3750, 868.4000, 868.6250, 868.6500, 868.6750, 868.9250 MHz

Call Sign WNS2917, Granted 01/18/2002.

AVALON (LOS ANGELES COUNTY), CALIFORNIA

856.2125, 856.7125, 857.2125, 857.7125, 858.2125, 859.2125, 860.2125, 860.9625 MHz

Call Sign WPMU835, Granted 01/14/1999.

HUNTINGTON BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU842, Granted 01/14/1999.

EMERALD BAY (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU844, Granted 01/14/1999.

GARDEN GROVE (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU845, Granted 01/14/1999.

HUNTINGTON BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU846, Granted 01/14/1999.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU847, Granted 01/14/1999.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU852, Granted 01/14/1999.

LA PALMA (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU856, Granted 01/14/1999.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU857, Granted 01/14/1999.

ANAHEIM (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU860, Granted 01/14/1999.

BREA (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU930, Granted 01/19/1999.

YORBA LINDA (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU931, Granted 01/19/1999.

BREA (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU935, Granted 01/19/1999.

SILVERADO (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMU939, Granted 01/19/1999.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

856.2125, 856.4625 MHz

Call Sign WPMX476, Granted 03/12/1999.

FULLERTON (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMX750, Granted 03/18/1999.

SAN JUAN CAPISTRANO (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMX751, Granted 03/18/1999.

SEAL BEACH (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMX752, Granted 03/18/1999.

NEWPORT BEACH (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMZ467, Granted 04/09/1999.

SANTA ANA (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1500, 866.1750, 866.3750, 866.4000, 866.6250, 866.6500, 866.6750, 866.8750, 866.9000, 867.1250, 867.1500,

867.1750, 867.3750, 867.4000, 867.6250, 867.6500, 867.6750, 867.8250, 867.8750, 867.9000, 868.1250, 868.1500, 868.1750, 868.3750, 868.4000, 868.6250, 868.6500, 868.6750, 868.9250 MHz

Call Sign WPMZ473, Granted 04/09/1999.

HUNTINGTON BEACH (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ480, Granted 04/09/1999.

SAN JUAN CAPISTRANO (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ481, Granted 04/09/1999.

NEWPORT BEACH (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ485, Granted 04/09/1999.

SILVERADO (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ486, Granted 04/09/1999.

SILVERADO (ORANGE COUNTY), CALIFORNIA

866.3500, 866.8500, 867.3500 MHz

Call Sign WPMZ511, Granted 04/09/1999.

MODJESKA (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ513, Granted 04/09/1999.

SAN CLEMENTE (ORANGE COUNTY), CALIFORNIA

866.1250, 866.1750, 866.3750, 866.6250, 866.8750, 867.1250, 867.3750, 867.6250, 867.8250, 867.8750, 868.1250, 868.3750, 868.6250, 868.6750, 868.9250 MHz

Call Sign WPMZ774, Granted 04/14/1999.

SILVERADO (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMZ776, Granted 04/14/1999.

SILVERADO (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPMZ991, Granted 04/16/1999.

FULLERTON (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.6750, 866.9000, 867.1500, 867.1750, 867.4000, 867.6500, 867.6750, 867.9000, 868.1500, 868.1750, 868.4000, 868.6500 MHz

Call Sign WPMZ992, Granted 04/16/1999.

LA PALMA (ORANGE COUNTY), CALIFORNIA

866.1500, 866.3250, 866.4000, 866.6500, 866.6750, 866.7000, 866.8500, 866.9000, 867.1500, 867.1750, 867.3250, 867.4000, 867.6500, 867.6750, 867.8500, 867.9000, 868.1500, 868.1750, 868.3250, 868.4000, 868.6500, 868.7000 MHz

Call Sign WPMZ993, Granted 04/16/1999.

YORBA LINDA (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.6750, 866.9000, 867.1500, 867.1750, 867.4000, 867.6500, 867.6750, 867.9000, 868.1500, 868.1750, 868.4000, 868.6500 MHz

Call Sign WPMZ994, Granted 04/16/1999.

BREA (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.6750, 866.9000, 867.1500, 867.1750, 867.4000, 867.6500, 867.6750, 867.9000, 868.1500, 868.1750, 868.4000, 868.6500 MHz

Call Sign WPNP991, Granted 04/28/1999.

SAN CLEMENTE (ORANGE COUNTY), CALIFORNIA

851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

Call Sign WPPA345, Granted 09/20/1999.

SEAL BEACH (ORANGE COUNTY), CALIFORNIA

866.2000, 866.3250, 866.3500, 866.7000, 866.8250, 866.8500, 867.2000, 867.3250, 867.3500, 867.7000, 867.8500, 868.2000, 868.3250, 868.3500, 868.7000, 868.8250 MHz

Call Sign WPPA346, Granted 09/20/1999.

HUNTINGTON BEACH (ORANGE COUNTY), CALIFORNIA

866.2000, 866.3500, 866.8250, 867.2000, 867.3500, 868.2000, 868.3500, 868.8250 MHz

Call Sign WPPA348, Granted 09/20/1999.

GARDEN GROVE (ORANGE COUNTY), CALIFORNIA

866.2000, 866.3250, 866.3500, 866.7000, 866.8250, 866.8500, 867.2000, 867.3250, 867.3500, 867.7000, 867.8500, 868.2000, 868.3250, 868.3500, 868.7000, 868.8250 MHz

Call Sign WPPA354, Granted 09/20/1999.

ANAHEIM (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.6750, 866.9000, 867.1500, 867.1750, 867.4000, 867.6500, 867.6750, 867.9000, 868.1500, 868.1750, 868.4000, 868.6500 MHz

Call Sign WPTB672, Granted 08/23/2001.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

866.1500, 866.3250, 866.4000, 866.6500, 866.8250, 866.9000, 867.1750, 867.3250, 867.6500, 867.6750, 867.9000, 868.1750, 868.2000, 868.4000, 868.8250 MHz

Call Sign WPTB681, Granted 08/23/2001.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.9000, 867.1750, 867.6500, 867.9000 MHz

Call Sign WPTD598, Granted 09/05/2001.

LAGUNA BEACH (ORANGE COUNTY), CALIFORNIA

866.1500, 866.4000, 866.6500, 866.9000, 867.1750, 867.6500, 867.9000 MHz

Call Sign WQZ938, Granted 03/18/1999.

ORANGE (ORANGE COUNTY), CALIFORNIA

806.0625, 811.2125, 811.4625, 811.7125, 811.9625, 812.2125, 812.4625, 812.7125, 812.9625, 813.2125, 813.4625, 813.7125, 813.9625, 814.2125, 814.4625, 814.7125, 814.9625, 815.2125, 815.4625, 815.7125, 815.9625, 851.0625, 856.2125, 856.4625, 856.7125, 856.9625, 857.2125, 857.4625, 857.7125, 857.9625, 858.2125, 858.4625, 858.7125, 858.9625, 859.2125, 859.4625, 859.7125, 859.9625, 860.2125, 860.4625, 860.7125, 860.9625 MHz

SAN DIEGO

Call Sign KNJ402, Granted 10/21/1998.

SAN DIEGO (SAN DIEGO COUNTY), CALIFORNIA

856.0250, 856.0500, 857.0000, 857.0250, 857.0500, 858.0000, 858.0250, 858.0500, 859.0000, 859.0250, 859.0500, 860.0000, 860.0250, 860.0500, 862.0500, 862.1000, 863.0500 MHz

SAN DIEGO COUNTY

Call Sign WPGV548, Granted 04/05/2000.

BRAWLEY (IMPERIAL COUNTY), CALIFORNIA

856.4250, 861.2500, 862.2500, 863.2500 MHz

Call Sign WPIR303, Granted 10/17/2001.

CALIPATRIA (IMPERIAL COUNTY), CALIFORNIA

856.0750, 857.0750, 858.0500, 858.0750, 85

Call Sign WPJT454, Granted 08/15/2001.

BOULEVARD (SAN DIEGO COUNTY), CALIFORNIA
858.2000, 859.2000, 861.1500, 862.1500 MHz

Call Sign WPJT680, Granted 10/22/2001.

CARLSBAD (SAN DIEGO COUNTY), CALIFORNIA
856.1750, 856.2000, 857.1750, 857.2000, 858.1750, 858.2000,
859.2000, 860.2000, 860.2250, 861.1500, 861.2000, 862.1500,
862.2000, 863.1500 MHz

Call Sign WPJT885, Granted 10/22/2001.

EL CAJON (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJT886, Granted 10/22/2001.

ALPINE (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJT887, Granted 10/22/2001.

JAMUL (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJT889, Granted 10/22/2001.

SAN DIEGO (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJT893, Granted 10/22/2001.

SAN YSIDRO (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJT894, Granted 10/22/2001.

JAMUL (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPJV681, Granted 10/22/2001.

SANTEES (SAN DIEGO COUNTY), CALIFORNIA
866.1375, 866.4125, 866.6375, 866.8875, 866.9125, 867.1375,
867.3875, 867.4125, 867.6125, 867.6375, 867.9125, 868.0750,
868.1375, 868.4125 MHz

Call Sign WPKA722, Granted 01/08/2002.

PAUMA VALLEY (SAN DIEGO COUNTY), CALIFORNIA
866.1125, 866.1875, 867.1875, 867.5875, 868.1875 MHz

Call Sign WPKA723, Granted 01/08/2002.

FALLBROOK (SAN DIEGO COUNTY), CALIFORNIA
867.1625, 868.1625, 868.6625 MHz

Call Sign WPKA725, Granted 01/08/2002.

BORRERO SPRINGS (SAN DIEGO COUNTY), CALIFORNIA
866.3625, 866.8625, 867.3625, 867.5875, 867.8750, 868.3750,
868.8625 MHz

Call Sign WPKA726, Granted 01/08/2002.

VALLEY CENTER (SAN DIEGO COUNTY), CALIFORNIA
866.1875, 866.6625, 867.1875, 867.6875, 868.3375, 868.8375 MHz

Call Sign WPKB641, Granted 01/08/2002.

JACUMBA (SAN DIEGO COUNTY), CALIFORNIA
856.1750, 857.1750, 858.1750, 861.2000 MHz

Call Sign WPKG477, Granted 02/20/2002.

SANTEES (SAN DIEGO COUNTY), CALIFORNIA
866.0625, 866.4375, 867.0500, 867.4375, 867.5875, 868.0500 MHz

Call Sign WPLW596, Granted 03/23/1998.

ESCONDIDO (SAN DIEGO COUNTY), CALIFORNIA
866.2750, 866.8000, 867.3000, 867.7500 MHz

Call Sign WPLW597, Granted 12/11/1998.

DESCANSO (SAN DIEGO COUNTY), CALIFORNIA
858.2000, 865.1500, 866.0875, 866.5750, 867.5625, 867.9500,
868.3750, 868.4375 MHz

Call Sign WPLW602, Granted 12/11/1998.

PAUMA VALLEY (SAN DIEGO COUNTY), CALIFORNIA
866.3875, 866.6875, 867.6625, 868.6875 MHz

Call Sign WPLW627, Granted 03/23/1998.

JAMUL (SAN DIEGO COUNTY), CALIFORNIA
866.9750, 867.4375, 867.8750, 868.3750, 868.9250 MHz

Call Sign WPMG349, Granted 07/15/1998.

PAUMA VALLEY (SAN DIEGO COUNTY), CALIFORNIA
866.0500, 866.0875, 867.0500, 867.5875, 868.0500, 868.4375,
868.4500 MHz

Call Sign WPMK586, Granted 08/25/1998.

JULIAN (SAN DIEGO COUNTY), CALIFORNIA
866.3375, 866.8375, 867.3375, 867.8375 MHz

Call Sign WPMT496, Granted 12/11/1998.

MOUNT LAGUNA (SAN DIEGO COUNTY), CALIFORNIA
866.4750, 867.1000, 867.5625, 867.8750, 868.4875 MHz

Call Sign WPMT497, Granted 12/11/1998.

DESCANSO (SAN DIEGO COUNTY), CALIFORNIA
862.0000, 866.3000, 867.4750, 867.9750, 868.5500, 868.9250 MHz

Call Sign WPMT498, Granted 12/11/1998.

JULIAN (SAN DIEGO COUNTY), CALIFORNIA
866.7750, 867.2750, 867.7750 MHz

Call Sign WPMT502, Granted 12/11/1998.

PINE VALLEY (SAN DIEGO COUNTY), CALIFORNIA
867.0750, 868.1000, 868.6000, 868.9500 MHz

Call Sign WPMT503, Granted 12/11/1998.

PAUMA VALLEY (SAN DIEGO COUNTY), CALIFORNIA
866.1000, 866.6000, 867.5750, 868.0500 MHz

Call Sign WPMT504, Granted 12/11/1998.

CAMPO (SAN DIEGO COUNTY), CALIFORNIA
860.2250, 866.2250, 867.2250, 867.7250 MHz

Call Sign WPNP222, Granted 04/16/1999.

PAUMA VALLEY (SAN DIEGO COUNTY), CALIFORNIA
866.1000, 866.6000, 867.5750, 868.0500 MHz

Call Sign WPTP345, Granted 10/11/2002.

San Marcos (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPTP345, Granted 10/11/2002.

Poway (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPTP345, Granted 10/11/2002.

San Diego (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPTP345, Granted 10/11/2002.

Poway (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPTP507, Granted 10/11/2002.

Vista (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPTP507, Granted 10/11/2002.

Rainbow (SAN DIEGO COUNTY), CALIFORNIA
861.0000, 861.5000, 863.0000, 863.2500, 864.2500, 865.0000 MHz

Call Sign WPUK475, Granted 03/21/2002.

Valley Center (SAN DIEGO COUNTY), CALIFORNIA
866.1875, 867.1875 MHz

Call Sign WPUW775, Granted 05/17/2002.

Campo (SAN DIEGO COUNTY), CALIFORNIA
860.2250 MHz

Call Sign WPUX912, Granted 05/23/2002.

Campo (SAN DIEGO COUNTY), CALIFORNIA
863.0000 MHz

Call Sign WPV8920, Granted 06/14/2002.

BANNER (SAN DIEGO COUNTY), CALIFORNIA
868.1000, 868.6000, 868.9500 MHz

SAN FRANCISCO, CITY & COUNTY

Call Sign WINKH215, Granted 03/13/2000.

SAN FRANCISCO (SAN FRANCISCO COUNTY), CALIFORNIA

856.2375, 857.2375, 858.2375 MHz

SAN FRANCISCO (SAN FRANCISCO COUNTY), CALIFORNIA

856.2375, 857.2375, 858.2375 MHz

SAN FRANCISCO (SAN FRANCISCO COUNTY), CALIFORNIA

856.2375, 858.2375 MHz

COLORADO

COLORADO SPRINGS

Call Sign WPHK775, Granted 06/01/2000.

COLORADO SPRINGS (EL PASO COUNTY), COLORADO
856.7625, 856.9375, 856.9625, 856.9875, 857.7625, 857.9375,
857.9625, 857.9875, 858.7625, 858.9375, 858.9625, 858.9875,
859.7625, 859.9375, 859.9625, 859.9875, 860.7375, 860.7625,
860.9375, 860.9625 MHz

Call Sign WPLU947, Granted 03/04/1998.

COLORADO SPRINGS (EL PASO COUNTY), COLORADO
855.2375, 856.2375, 857.2375, 858.2375, 859.2375 MHz
COLORADO SPRINGS (EL PASO COUNTY), COLORADO
855.4875, 856.4875, 857.4875, 858.4875, 859.4875 MHz
FOUNTAIN (EL PASO COUNTY), COLORADO
856.9875, 857.9875, 858.9875, 859.9875, 860.9875 MHz
COLORADO SPRINGS (EL PASO COUNTY), COLORADO
855.7375, 856.7375, 857.7375, 859.7375, 860.7375 MHz

COLORADO, STATE

Call Sign WPHK881, Granted 06/13/2000.

PUEBLO (PUEBLO COUNTY), COLORADO
866.0125, 866.9875, 867.4875, 867.9875, 868.4875, 868.9875 MHz

Call Sign WPRV777, Granted 02/21/2001.

FT COLLINS (LARIMER COUNTY), COLORADO
866.3750, 866.8125, 867.4000, 867.6125, 868.2625 MHz

Call Sign WPRV815, Granted 02/22/2001.

GREELEY (WELD COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPRV816, Granted 02/22/2001.

BARNESVILLE (WELD COUNTY), COLORADO
866.6500, 867.2125, 868.0375, 868.5625, 868.8000 MHz

Call Sign WPSG917, Granted 04/23/2001.

STERLING (LOGAN COUNTY), COLORADO
866.0625, 866.3125, 866.7625, 867.0625, 867.3250 MHz

Call Sign WPSH437, Granted 04/26/2001.

HUGO (LINCOLN COUNTY), COLORADO
866.0875, 866.3375, 867.4375, 867.7500, 868.2125 MHz

Call Sign WPSH613, Granted 04/30/2001.

ANTON (WASHINGTON COUNTY), COLORADO
866.1500, 866.9500, 867.7000, 868.4750, 868.9250 MHz

Call Sign WPSK325, Granted 05/29/2001.

FORT MORGAN (MORGAN COUNTY), COLORADO
866.2250, 866.7750, 867.3625, 867.8750, 868.4375 MHz

Call Sign WPSK701, Granted 06/04/2001.

AKRON (WASHINGTON COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPSM559, Granted 06/20/2001.

CROOK (LOGAN COUNTY), COLORADO
866.3500, 866.6000, 866.9250, 867.5875, 867.7375 MHz

Call Sign WPSQ525, Granted 07/11/2001.

RAMAH (ELBERT COUNTY), COLORADO
866.2625, 866.4125, 867.1875, 868.2250, 868.5750 MHz

Call Sign WPTL723, Granted 10/26/2001.

BETHONE (KIT CARSON COUNTY), COLORADO
866.2500, 866.7125, 866.9125, 867.6875, 867.9125 MHz

Call Sign WPTL725, Granted 10/26/2001.

WRAY (YUMA COUNTY), COLORADO
866.7375, 867.1500, 867.7125, 868.1750, 868.8750 MHz

Call Sign WPTM601, Granted 10/30/2001.

RAYMER (WELD COUNTY), COLORADO
866.2750, 866.4500, 866.9750, 867.4750, 868.6250 MHz

Call Sign WPTN359, Granted 11/06/2001.

BENNETT (ARAPAHOE COUNTY), COLORADO
866.1250, 867.2500, 867.6625, 868.1625 MHz

Call Sign WPTP867, Granted 11/19/2001.

COLORADO SPRINGS (EL PASO COUNTY), COLORADO
866.0500, 866.2000, 866.3875, 866.7250, 867.3000, 867.7875,
868.0500 MHz

Call Sign WPTW329, Granted 12/28/2001.

TRINIDAD (LAS ANIMAS COUNTY), COLORADO
866.1625, 866.6125, 866.8625, 867.6250, 868.8500 MHz

Call Sign WPUJ277, Granted 03/14/2002.

BUENA VISTA (CHAFFEE COUNTY), COLORADO
866.0875, 866.3375, 867.4375, 867.7500, 868.2125 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

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867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
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867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

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GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

Call Sign WPUJ668, Granted 03/18/2002.

GALETEA (KIOWA COUNTY), COLORADO
867.1375, 867.9750, 868.2500, 868.5000, 868.9500 MHz

LOVELAND (LARIMER COUNTY), COLORADO
866.3875, 866.5750, 866.7000, 866.8750, 867.2750, 867.5750,
867.8500, 868.1000, 868.2875, 868.6375 MHz
ESTES PARK (LARIMER COUNTY), COLORADO
866.0500, 867.0750, 868.8250 MHz
GRANBY (GRAND COUNTY), COLORADO
868.0750, 868.7625 MHz

CONNECTICUT

CONNECTICUT, STATE

Call Sign WNSM668, Granted 06/19/2000.

HADDAM (MIDDLESEX COUNTY), CONNECTICUT

866.0125, 866.2125, 866.4375, 866.5125, 867.0125, 867.2625,
867.5125, 867.6500, 868.0125, 868.9125 MHz

Call Sign WNSM669, Granted 04/12/2000.

CANAAN (LITCHFIELD COUNTY), CONNECTICUT

866.0125, 866.1375, 866.5125, 866.6125, 866.8625, 867.0125,
867.2250, 867.5125, 868.0125, 868.6125 MHz

Call Sign WNSM670, Granted 04/12/2000.

NORFOLK (LITCHFIELD COUNTY), CONNECTICUT

866.0125, 866.1375, 866.5125, 866.6125, 866.8625, 867.0125,
867.2250, 867.5125, 868.0125, 868.6125 MHz

Call Sign WNSM671, Granted 04/12/2000.

SHARON (LITCHFIELD COUNTY), CONNECTICUT

866.0125, 866.1375, 866.5125, 866.6125, 866.8625, 867.0125,
867.2250, 867.5125, 868.0125, 868.6125 MHz

Call Sign WNSM672, Granted 04/12/2000.

WESTBROOK (MIDDLESEX COUNTY), CONNECTICUT

866.0125, 866.3000, 866.5125, 866.7500, 867.0125, 867.0750,
867.5125, 868.0125, 868.1625, 868.5625 MHz

Call Sign WNSM673, Granted 06/19/2000.

GUILFORD (NEW HAVEN COUNTY), CONNECTICUT

866.0125, 866.2750, 866.3000, 866.5125, 866.6375, 866.7500,
867.0125, 867.0750, 867.1375, 867.5125, 867.7000, 868.0125,
868.1625, 868.3125, 868.5625 MHz

Call Sign WNSM674, Granted 04/12/2000.

WILTON (FAIRFIELD COUNTY), CONNECTICUT

866.0125, 866.5125, 866.7125, 867.0125, 867.2000, 867.5125,
867.5875, 868.0125, 868.2000, 868.7500 MHz

Call Sign WNSM675, Granted 04/12/2000.

WOLCOTT (NEW HAVEN COUNTY), CONNECTICUT

866.0125, 866.1375, 866.2750, 866.3000, 866.5125, 866.6125,
866.6375, 866.7500, 866.8625, 867.0125, 867.0750, 867.1375,

867.2250, 867.5125, 867.7000, 868.0125, 868.1625, 868.3125,
868.5625, 868.6125 MHz

Call Sign WNSM676, Granted 04/12/2000.

CORNWALL (LITCHFIELD COUNTY), CONNECTICUT

866.0125, 866.1375, 866.3000, 866.5125, 866.6125, 866.7500,
866.8625, 867.0125, 867.0750, 867.2250, 867.5125, 868.0125,
868.1625, 868.5625, 868.6125 MHz

Call Sign WNSM677, Granted 04/12/2000.

SOUTHBURY (NEW HAVEN COUNTY), CONNECTICUT

866.0125, 866.2750, 866.5125, 866.6375, 867.0125, 867.1375,
867.5125, 867.7000, 868.0125, 868.3125 MHz

Call Sign WNSM678, Granted 06/19/2000.

DANBURY (FAIRFIELD COUNTY), CONNECTICUT

866.0125, 866.2750, 866.5125, 866.6375, 867.0125, 867.1375,
867.5125, 867.7000, 868.0125, 868.3125 MHz

Call Sign WNSM679, Granted 06/19/2000.

NEW MILFORD (LITCHFIELD COUNTY), CONNECTICUT

856.4875, 857.4875, 858.4875, 859.7625, 866.0125, 866.5125,
866.6375, 867.0125, 867.1375, 867.5125, 867.7000, 868.0125,
868.3125 MHz

Call Sign WNSM680, Granted 06/19/2000.

BETHANY (NEW HAVEN COUNTY), CONNECTICUT

866.0125, 866.2750, 866.5125, 866.6375, 867.0125, 867.1375,
867.5125, 867.7000, 868.0125, 868.3125 MHz

Call Sign WNSM681, Granted 06/19/2000.

GREENWICH (FAIRFIELD COUNTY), CONNECTICUT

866.0125, 866.5125, 866.7125, 867.0125, 867.2000, 867.5125,
867.5875, 868.0125, 868.2000, 868.7500 MHz

Call Sign WNSM682, Granted 06/19/2000.

WEST HAVEN (NEW HAVEN COUNTY), CONNECTICUT

866.0125, 866.5125, 866.7125, 867.0125, 867.2000, 867.5125,
867.5875, 868.0125, 868.2000, 868.7500 MHz

Call Sign WPGU367, Granted 04/06/2000.

MANCHESTER (HARTFORD COUNTY), CONNECTICUT

866.0125, 866.2125, 866.3000, 866.4375, 866.5125, 866.7500,
867.0125, 867.0750, 867.2625, 867.5125, 867.6500, 868.0125,
868.1625, 868.5625, 868.9125 MHz

Call Sign WPGU368, Granted 04/06/2000.

BLOOMFIELD (HARTFORD COUNTY), CONNECTICUT

866.0125, 866.1375, 866.5125, 866.6125, 866.8625, 867.0125,
867.2250, 867.5125, 868.0125, 868.6125 MHz

Call Sign WPGU369, Granted 04/06/2000.

UNION (TOLLAND COUNTY), CONNECTICUT

866.0125, 866.2125, 866.4375, 866.5125, 866.7125, 867.0125,
867.2000, 867.2625, 867.5125, 867.5875, 867.6500, 868.0125,
868.2000, 868.7500, 868.9125 MHz

Call Sign WPGU370, Granted 04/06/2000.

COLCHESTER (NEW LONDON COUNTY), CONNECTICUT

866.0125, 866.2125, 866.4375, 866.5125, 867.0125, 867.2625,
867.5125, 867.6500, 868.0125, 868.9125 MHz

Call Sign WPGU371, Granted 04/06/2000.

STERLING (WINDHAM COUNTY), CONNECTICUT

866.0125, 866.1125, 866.5125, 866.7125, 866.8250, 867.0125,
867.1625, 867.2000, 867.5125, 867.5875, 867.6250, 868.0125,
868.2000, 868.3375, 868.7500 MHz

Call Sign WPGU372, Granted 04/06/2000.

LEDYARD (NEW LONDON COUNTY), CONNECTICUT

866.0125, 866.1125, 866.5125, 866.8250, 867.0125, 867.1625,
867.5125, 867.6250, 868.0125, 868.3375 MHz

Call Sign WPGU373, Granted 04/06/2000.

NORTH GROSVENORDALE (WINDHAM COUNTY), CONNECTICUT

866.0125, 866.5125, 866.7125, 867.0125, 867.2000, 867.5125,
867.5875, 868.0125, 868.2000, 868.7500 MHz

Call Sign WPGU374, Granted 04/06/2000.

BROOKLYN (WINDHAM COUNTY), CONNECTICUT

866.5125, 866.7125, 867.0125, 867.2000, 867.5125, 867.5875,
868.0125, 868.2000, 868.7500 MHz

Call Sign WPGU375, Granted 04/06/2000.

OLD LYME (NEW LONDON COUNTY), CONNECTICUT

866.0125, 866.1125, 866.2125, 866.3000, 866.4375, 866.5125,
866.7500, 866.8250, 867.0125, 867.0750, 867.1625, 867.2625,
867.5125, 867.6250, 867.6500, 868.0125, 868.1625, 868.3375,
868.5625, 868.9125 MHz

Call Sign WPHC501, Granted 05/10/2000.

STORRS (TOLLAND COUNTY), CONNECTICUT

866.0125, 866.2125, 866.4375, 866.5125, 866.7125, 867.0125,
867.2000, 867.2625, 867.5125, 867.5875, 867.6500, 868.0125,
868.2000, 868.7500, 868.9125 MHz

Call Sign WPPF755, Granted 11/30/1999.

PLYMOUTH (LITCHFIELD COUNTY), CONNECTICUT

856.4875, 857.4875, 858.4875, 859.7625 MHz

Call Sign WPGU376, Granted 04/06/2000.

KENT (LITCHFIELD COUNTY), CONNECTICUT

856.4875, 857.4875, 858.4875, 859.7625 MHz

Call Sign WPGU377, Granted 04/06/2000.

WASHINGTON (LITCHFIELD COUNTY), CONNECTICUT

855.2125, 857.2375, 859.9375 MHz

Call Sign WPGU378, Granted 04/06/2000.

BRISTOL (HARTFORD COUNTY), CONNECTICUT

858.7625, 859.4875, 860.4875 MHz

Call Sign WPR1286, Granted 09/27/2000.

NORTH STONINGTON (NEW LONDON COUNTY), CONNECTICUT

866.0125, 866.1125, 866.5125, 866.8250, 867.0125, 867.1625,
867.5125, 867.6250, 868.0125, 868.3375 MHz

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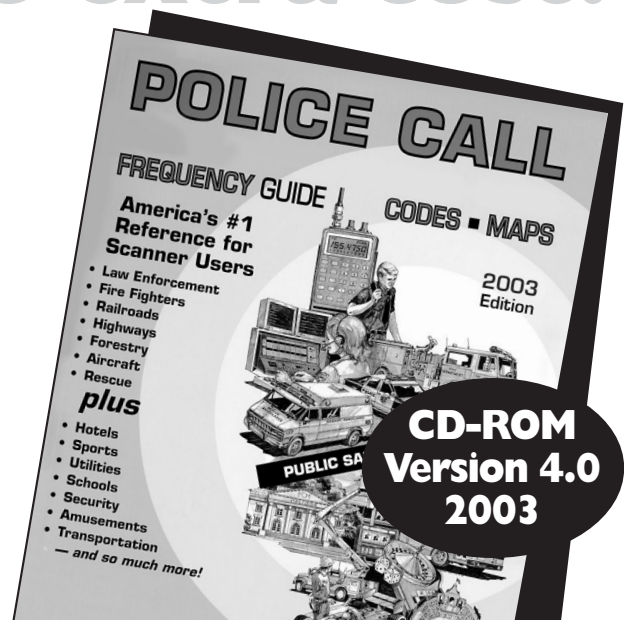
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Call Sign WPRI536, Granted 10/02/2000.

ROCKY HILL (HARTFORD COUNTY), CONNECTICUT

866.0125, 866.2125, 866.3000, 866.4375, 866.5125, 866.7500,
867.0125, 867.0750, 867.2625, 867.5125, 867.6500, 868.0125,
868.1625, 868.5625, 868.9125, 868.9375, 868.9500, 868.9625,
868.9750, 868.9875 MHz

Call Sign WPTB204, Granted 08/21/2001.

TOLLAND (TOLLAND COUNTY), CONNECTICUT

866.0125, 866.2125, 866.4375, 866.5125, 867.0125, 867.2625,
867.5125, 867.6500, 868.0125, 868.9125 MHz

Call Sign WPUZ457, Granted 05/31/2002.

SHARON (LITCHFIELD COUNTY), CONNECTICUT

855.2125, 857.2375, 859.9375 MHz

DELAWARE

DELAWARE, STATE

Call Sign WPIQ290, Granted 09/25/2000.

MILTON (SUSSEX COUNTY), DELAWARE

866.0125, 866.1000, 866.3625, 866.5125, 867.0125, 867.0875,
867.3500, 867.5125, 867.6000, 867.8375, 868.0125, 868.0875,
868.1125, 868.3500, 868.5875 MHz

SEAFORD (SUSSEX COUNTY), DELAWARE

866.0125, 866.1000, 866.3625, 866.5125, 867.0125, 867.0875,
867.3500, 867.5125, 867.6000, 867.8375, 868.0125, 868.0875,
868.1125, 868.3500, 868.5875 MHz

DAGSBORO (SUSSEX COUNTY), DELAWARE

866.0125, 866.1000, 866.3625, 866.5125, 867.0125, 867.0875,
867.3500, 867.5125, 867.6000, 867.8375, 868.0125, 868.0875,
868.1125, 868.3500, 868.5875 MHz

Call Sign WPI2596, Granted 02/06/2001.

DOVER (KENT COUNTY), DELAWARE

866.0125, 866.0750, 866.5125, 866.6500, 866.6750, 867.0125,
867.1250, 867.5125, 867.6500, 867.6750, 867.9500, 868.0125,
868.6500, 868.7500, 868.9000 MHz

FELTON (KENT COUNTY), DELAWARE

866.0125, 866.0750, 866.5125, 866.6500, 866.6750, 867.0125,
867.1250, 867.5125, 867.6500, 867.6750, 867.9500, 868.0125,
868.6500, 868.7500, 868.9000 MHz

Call Sign WPSI864, Granted 05/14/2001.

WILMINGTON (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

WILMINGTON (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

NEWARK (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

CHESAPEAKE (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

SMYRNA (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

Call Sign WPVW536, Granted 08/28/2002.

SMYRNA (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.0750, 866.5125, 866.6500, 866.6750, 867.0125,
867.1250, 867.5125, 867.6500, 867.6750, 867.9500, 868.0125,
868.6500, 868.7500, 868.9000 MHz

Call Sign WPVW537, Granted 08/28/2002.

Claymont (NEW CASTLE COUNTY), DELAWARE

866.0125, 866.2375, 866.4875, 866.5125, 866.5625, 866.7250,
867.0125, 867.0375, 867.2375, 867.4875, 867.5125, 867.7125,
867.7375, 868.0125, 868.2125, 868.3875, 868.7125, 868.9375,
868.9625 MHz

Call Sign WPVW538, Granted 08/28/2002.

Rehoboth Beach (SUSSEX COUNTY), DELAWARE

866.0125, 866.1000, 866.3625, 866.5125, 867.0125, 867.0875,
867.3500, 867.5125, 867.6000, 867.8375, 868.0125, 868.0875,
868.1125, 868.3500, 868.5875 MHz

Call Sign WPVW540, Granted 08/28/2002.

HARTLY (KENT COUNTY), DELAWARE

866.1625, 866.7625, 867.9750, 868.6125, 868.8625 MHz

Call Sign WPVW541, Granted 08/28/2002.

WILMINGTON (NEW CASTLE COUNTY), DELAWARE

866.3000, 866.6500, 866.8250, 867.1250, 867.3000, 867.6625,
868.3250, 868.5000 MHz

Call Sign WPVW542, Granted 08/28/2002.

HOCKESSIN (NEW CASTLE COUNTY), DELAWARE

866.5375, 866.7875, 867.2625, 867.4250, 867.7750, 868.0875,
868.5750 MHz

DISTRICT OF COLUMBIA

Metropolitan Washington Airports Authority

Call Sign WPUL460, Granted 09/04/2002.

Washington, DISTRICT OF COLUMBIA

867.7625 MHz

Herndon (LOUDOUN COUNTY), VIRGINIA

867.2375 MHz

Call Sign WPAY961, Granted 11/24/1997.

CHANTILLY (LOUDOUN COUNTY), VIRGINIA

866.0125, 866.0500, 866.5125, 866.6750, 866.8875, 866.9250,
867.0125, 867.2000, 867.3500, 867.4375, 867.4625, 867.5125,
867.5375, 867.5625, 868.0125, 868.2125, 868.8000 MHz

ALEXANDRIA, VIRGINIA

866.0125, 866.0500, 866.5125, 866.6750, 866.8875, 866.9250,
867.0125, 867.2000, 867.3500, 867.4375, 867.4625, 867.5125,
867.5375, 867.5625, 868.0125, 868.2125, 868.8000 MHz

MCLEAN (FAIRFAX COUNTY), VIRGINIA

866.0500, 866.6750, 866.8875, 866.9250, 867.2000, 867.3500,
867.4375, 867.4625, 867.5375, 867.5625, 868.2125, 868.8000 MHz

FLORIDA

APOPKA

Call Sign WNPE229, Granted 05/01/1999.

APOPKA (ORANGE COUNTY), FLORIDA

855.7125, 855.9625, 856.9625, 857.9625, 858.9625, 859.9625 MHz

GAINESVILLE

Call Sign WPHX854, Granted 07/31/2000.

MILLHOPPER (ALACHUA COUNTY), FLORIDA

857.4625, 858.4625, 858.9875, 859.4625, 859.9875, 860.4625,
860.9875 MHz

GAINESVILLE (ALACHUA COUNTY), FLORIDA

857.4625, 858.4625, 858.9875, 859.4625, 859.9875, 860.4625,
860.9875 MHz

Call Sign WPTA884, Granted 08/21/2001.

GAINESVILLE (ALACHUA COUNTY), FLORIDA

866.0875, 866.1875, 866.7750, 867.1875, 867.2750, 867.5625,
867.6875, 867.7750, 867.8125, 868.0625, 868.3125, 868.5250,
868.5625, 868.6750, 868.7750, 868.8125 MHz

GAINESVILLE (ALACHUA COUNTY), FLORIDA

866.0875, 866.1875, 866.7750, 867.1875, 867.2750, 867.5625,
867.6875, 867.7750, 867.8125, 868.0625, 868.3125, 868.5250,
868.5625, 868.6750, 868.7750, 868.8125 MHz

GAINESVILLE (ALACHUA COUNTY), FLORIDA

866.0875, 866.1875, 866.7750, 867.1875, 867.2750, 867.5625,
867.6875, 867.7750, 867.8125, 868.0625, 868.3125, 868.5250,
868.5625, 868.6750, 868.7750, 868.8125 MHz

GAINESVILLE (ALACHUA COUNTY), FLORIDA

866.0875, 866.1875, 866.7750, 867.1875, 867.2750, 867.5625,
867.6875, 867.7750, 867.8125, 868.0625, 868.3125, 868.5250,
868.5625, 868.6750, 868.7750, 868.8125 MHz

GAINESVILLE (ALACHUA COUNTY), FLORIDA

866.0875, 866.1875, 866.7750, 867.1875, 867.2750, 867.5625,
867.6875, 867.7750, 867.8125, 868.0625, 868.3125, 868.5250,
868.5625, 868.6750, 868.7750, 868.8125 MHz

PALM BEACH COUNTY

Call Sign WNHE888, Granted 12/27/2001.

WEST PALM BEACH (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

DELRAY BEACH (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

LOXAHATCHEE (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

PAHOKEE (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

BOCA RATON (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

BELLE GLADES (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

Call Sign WPKN584, Granted 04/02/2002.

WEST PALM BEACH (PALM BEACH COUNTY), FLORIDA

866.1000, 866.1250, 866.3250, 866.3500, 866.6000, 866.6250,
866.7500, 866.8250, 866.8500, 867.1000, 867.3250, 867.3500,
867.3750, 867.4000, 867.5750, 867.7625, 868.2250, 868.3750,
868.6500, 868.7000, 868.7250 MHz

DELRAY BEACH (PALM BEACH COUNTY), FLORIDA

866.1000, 866.1250, 866.3250, 866.3500, 866.6000, 866.6250,
866.7500, 866.8250, 866.8500, 867.1000, 867.3250, 867.3500,
867.3750, 867.4000, 867.5750, 867.7625, 868.2250, 868.3750,
868.6500, 868.7000, 868.7250 MHz

LOXAHATCHEE (PALM BEACH COUNTY), FLORIDA

866.1000, 866.1250, 866.3250, 866.3500, 866.6000, 866.6250,
866.7500, 866.8250, 866.8500, 867.1000, 867.3250, 867.3500,

867.3750, 867.4000, 867.5750, 867.7625, 868.2250, 868.3750,
868.6500, 868.7000, 868.7250 MHz

PAHOKEE (PALM BEACH COUNTY), FLORIDA

866.1000, 866.1250, 866.3250, 866.3500, 866.6000, 866.6250,
866.7500, 866.8250, 866.8500, 867.1000, 867.3250, 867.3500,
867.3750, 867.4000, 867.5750, 867.7625, 868.2250, 868.3750,
868.6500, 868.7000, 868.7250 MHz

PALM BEACH COUNTY

Call Sign WPRS827, Granted 01/17/2001.

WEST PALM BEACH (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

BOYNTON BEACH (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

JUPITER (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

SINGER ISLAND (PALM BEACH COUNTY), FLORIDA

856.3125, 856.3375, 857.3125, 857.3375, 858.3125, 858.3375,
859.3125, 859.3375, 860.3125, 860.3375 MHz

PINELLAS COUNTY

Call Sign WPIR956, Granted 11/13/2001.

SAINT PETERSBURG (PINELLAS COUNTY), FLORIDA

866.0875, 866.1625, 866.2000, 866.3000, 866.3375, 866.5375,
866.5875, 866.9000, 867.0875, 867.1500, 868.0750, 868.1625,
868.2000, 868.3500, 868.3750, 868.4125, 868.6250, 868.6625,
868.8625, 868.9125 MHz

TARPON SPRINGS (PINELLAS COUNTY), FLORIDA

866.0875, 866.1625, 866.2000, 866.3000, 866.3375, 866.5375,
866.5875, 866.9000, 867.0875, 867.1500, 868.0750, 868.1625,
868.2000, 868.3500, 868.3750, 868.4125, 868.6250, 868.6625,
868.8625, 868.9125 MHz

CLEARWATER (PINELLAS COUNTY), FLORIDA

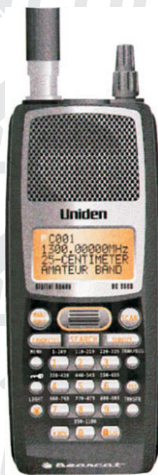
866.0875, 866.1625, 866.2000, 866.3000, 866.3375, 866.5375,
866.5875, 866.9000, 867.0875, 867.1500, 868.0750, 868.1625,
868.2000, 868.3500, 868.3750, 868.4125, 868.6250, 868.6625,
868.8625, 868.9125 MHz

SAINT PETERSBURG (PINELLAS COUNTY), FLORIDA

866.0875, 866.1625, 866.2000, 866.3000, 866.3375, 866.5375,
866.5875, 866.9000, 867.0875, 867.1500, 868.0750, 868.1625,
868.2000, 868.350

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The Uniden BC-785D Mobile

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- **Follows Motorola, Ericsson (EDACS) and Johnson (LTR) systems,** and an optional card activates the low-level decoding of the new APCO-25 digital communications, but not level III encryption. The card also provides an additional 600 memory channels.
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- **Clone Feature:** Allows for cloning of another scanner's programmed frequencies.
- **and more.....**

The long-touted BC785D and BC250D follow Motorola, Ericsson (EDACS) and Johnson (LTR) systems, {an optional card activates the low-level decoding of the new APCO-25 digital communications, but not level III encryption}. Frequency Coverage is 25-512 MHz and 806-1300 MHz {less cellular} with 1000 memory channels.

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SCN 41 is expected to ship in January, 2003

Pesky Lead-In Cables and Traveling SW Radios

I recently received an email from *MT* reader Frank Aigner from Bridgewater, Virginia, who wrote in part: "I see too many articles on antennas but absolutely nothing on getting the wires into the house or shack." This is a great point and one of those unspoken topics which everyone takes for granted that we'll all figure out when the time comes. I've been routing various antenna lead-in wires and cables for decades and have come across a number of solutions, some of which might actually be useful to your situation.

For years many hams with old-style wood casement windows have placed a 2 x 4 exactly the width of the window, with holes drilled through it for the cables, under the window. With the window closed as far as it will go on the 2 x 4 and with pieces of 1 x 2 cut to length and wedged between the top of the bottom portion of the window to the top of the window jam, the window is fairly secure against entry.

The problem is that you have an unsightly mess of wires coming into house and, inside, the same mess going to the gear. Another problem is that you no longer have use of the window for fair weather, and it's probably not a good weather seal. A driving rain might easily penetrate this set-up unless you lay a bead of silicone caulk on both top and bottom of the 2 x 4.

❖ High or Low Installation

There are other ways to bring cables into your listening post, but first, you'll need to assess your own circumstances. For instance is the antenna on the roof? Away from the house? Will the lead-in be buried and come up from the ground or will it be coming into the house from above?

If it's a roof-mounted antenna such as a VHF/UHF TV antenna or a scanner beam, or even if it's just a quarterwave ground plane antenna, coming in from the gable end of the house is the easiest. Many gable ends have horizontal vents at the peak which allow built-up heat in the attic to escape. These vents are covered from the inside with a wire mesh (to prevent insects, birds, and squirrels from getting in).

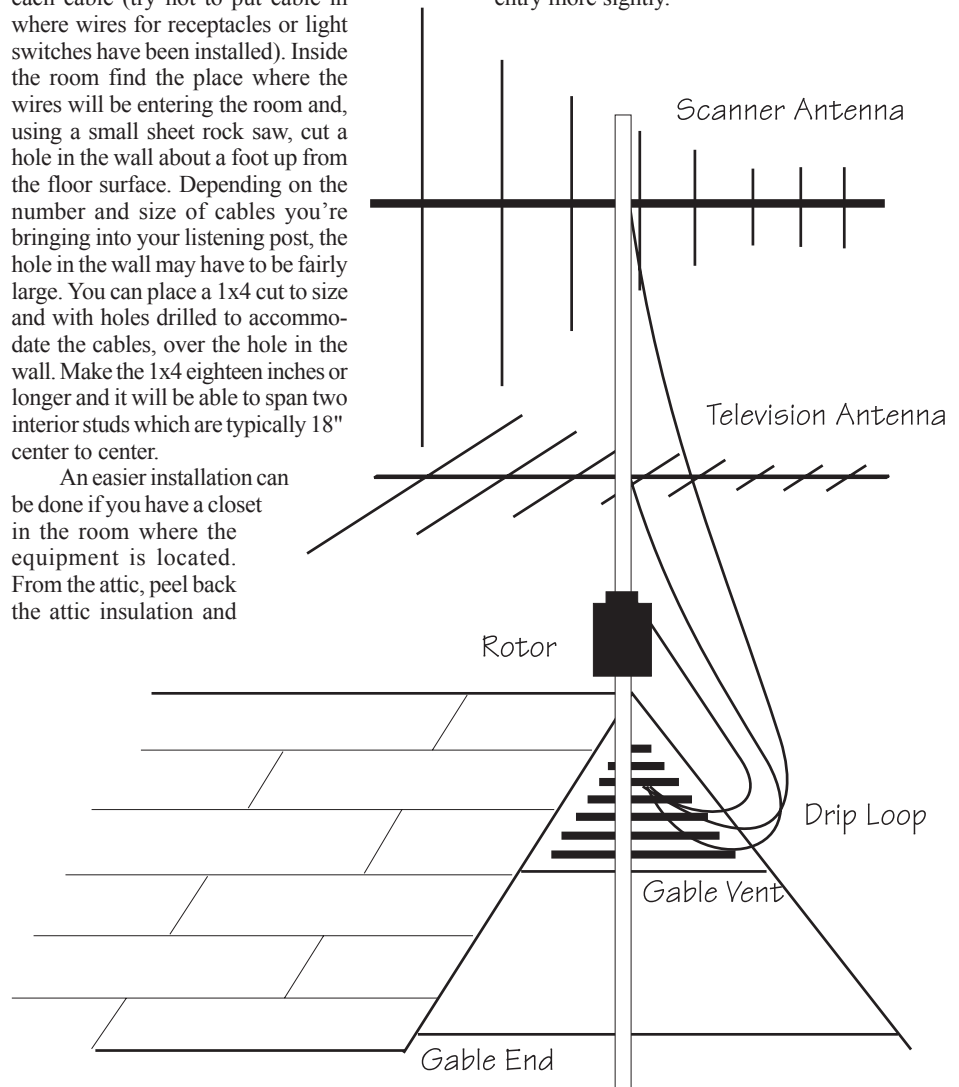
Bring the lead-in cable from the antenna to the gable end and cut the wire mesh to allow the cable to go through. Always make a "drip loop" (see illustration) with the cable to prevent rain from running into the attic space. With a TV, ham and scanner antenna attached to the same mast and using a rotator, you may have as many as four cables coming into the attic space. The gable vent will allow you to bring them all in; just don't forget to drip loop each cable.

Some roofs have a "vent cap" built into the roofing at the peak. In this case there is no gable vent and you'll need a ladder long enough to reach the peak of the gable and a drill to drill holes big enough to insert each cable (don't forget the drip loop!). Pack the entry point with Coax-Seal or similar product.

Once you're in the house, you can route the cable to the room where you have your equipment. Now drill a hole on top of the stud wall for each cable (try not to put cable in where wires for receptacles or light switches have been installed). Inside the room find the place where the wires will be entering the room and, using a small sheet rock saw, cut a hole in the wall about a foot up from the floor surface. Depending on the number and size of cables you're bringing into your listening post, the hole in the wall may have to be fairly large. You can place a 1x4 cut to size and with holes drilled to accommodate the cables, over the hole in the wall. Make the 1x4 eighteen inches or longer and it will be able to span two interior studs which are typically 18" center to center.

An easier installation can be done if you have a closet in the room where the equipment is located. From the attic, peel back the attic insulation and

find the ceiling of the closet. Now drill a hole through the sheet rock in the ceiling near the door of the closet. From inside the closet the cables can be routed down and under the closet door and run to where the gear is. If you don't have a closet and if your equipment is in a shelf system, you may be able to get away with simply drilling a hole in the ceiling above the shelf system and dropping the cable down to the shelves. You can use a coax feedthrough bushing (RS #278-1644) to make the entry more sightly.



Don't Forget the Drip Loop! Before wire or cable comes into the house from above, such as antennas on a tower, let the cable go below the entry point to allow rain to drip off the wire and not run into your attic.

◆ Low Entry Cable Lead-ins

If you only have one cable coming into the house from ground level the solution is very simple and really cheap. Radio Shack has a "wall-thru" lead-in tube (Cat #15-1200 \$4), which is a clear plastic tube about an inch in diameter and about a foot long.



Radio Shack's "Wall-thru" lead-in tube fits walls up to 13" thick and features rubber gasket for the exterior opening. (Courtesy Radio Shack)

To effect the installation you'll need a drill with a drill bit at least as big as the outside diameter of the tube. You'll also need this bit to be as long as the full thickness of the exterior wall through which you're trying to drill. I've found the easiest thing to do is use an old-fashioned "brace and bit" style hand drill. It may take a little longer but it really does the job. The exterior end is permanently attached to the tube and has a rubber gasket which fits around and seals the coax cable. The interior end has a detachable flange, which covers the wallboard opening.

Depending on the thickness of your exterior wall, you may need to cut off part of the plastic tube. I have used a hacksaw for this or you could use a backsaw from a miter box, but the two main concerns are not to crack the tube and to get a square cut. Once you have it cut and in place, slide the coax into the tube. In the case of RG/8 cable you may find that you'll have to cut off the connector in order to get the cable through the tube. In this case you'll simply have to put on a new connector.

I've found that I can put two RG/8mini or two RG/58 cables or one RG/6 and a rotor cable into one feedthrough tube. If you have more cables, simply drill more holes through the wall and fit them with the feedthrough tubes. I've installed three such feedthrough tubes to accommodate four lead-in coax, a rotor bundle, and the wires to my electronic weather station. It helps if you have shrubs or other plantings to cover the sight of all those antenna tubes coming into the house.

Most house sidings – aluminum, clapboard, vinyl, and plywood – are easily drilled through, but brick and masonry will prove a real challenge. Try a masonry bit in a power drill.

Caution: When drilling or cutting into any wall, be aware that electrical wiring is typically strung through the interior and exterior studs to receptacles and light switches. You have to ascertain where the household current wire is to avoid cutting or nicking it. Be sure to seal any exterior holes against critters entering the house.

◆ The Satellite TV solution

When you have more than one or two cables coming into the house you may want to try the solution used for years by satellite TV installers. Skyvision carries a "cable wall plate" (Cat. #02-3000024 \$13), which is a flat plate with a covered, angular opening which allows multiple cables (usually two RG/6 and two sets of smaller gauge

wires) to enter via an exterior wall. The installation is simple, requiring only a hole big enough for the cables to be cut into the siding. Screws hold the plate to the siding. Any openings can be filled with Coax-Seal or similar product. Skyvision also sells cable wall plates for ribbon cable and standard single coax. These plates cost \$5. Call

Cable Wall Plate. This handy wall plate accommodates a range of cable numbers and sizes costs about \$13. (Courtesy Skyvision)



Skyvision at 800-500-9275 or visit their web site at <http://www.skyvision.com>.

My satellite TV cables are buried in the ground and brought to the house at the bottom of an exterior wall. I have VHF/UHF TV and 2 meter antennas mounted on a rotated mast with all those wires being fed through the gable vent. And, finally, I have my ham wire and Beverage antenna lead-ins also buried and coming to the house at the base of the wall by way of the feedthrough tubes.

But, for 450 Ohm ladder line, another strategy is required. This lead-in can't be buried and needs to be away from metal objects, so I've had success routing this wire through the wall using a satellite cable wall plate.

If you have had experience in feeding antenna lines through exterior walls, *Beginner's Corner* readers would like to hear your story. So write!

◆ Traveling with a Short Wave Radio

Another reader recently wrote in with a question about what to look for when buying a shortwave radio for a long trip abroad. I came up with the following four tips:

- 1) Price should be a concern. Don't buy anything that can't be replaced without much financial outlay in case your radio is stolen or lost.
- 2) Size and weight are also concerns. Some "portable" shortwave radios weigh 5 pounds with batteries.
- 3) Number and size of batteries needed to operate in the field are another concern. Some portables use six, seven, even eight "C" batteries, which are big and heavy. Also consider your destination and how readily available and expensive such batteries will be there.
- 4) Unless you're interested in monitoring the ham bands don't worry about extras such as SSB capability. If you're just listening for news and entertainment you won't need narrow/wide bandwidth, a BFO, etc.

Probably the biggest concern is how long batteries last in any given portable. I did a test with a couple of portable radios here at the house and found that the most economical was the Radio Shack DX 350 (a no-frills analog radio no longer available) which ran 24 hours a

day for more than a week on just three "AAA" batteries.

These days Radio Shack only offers three shortwave portables starting at \$100. But, the Grundig FR-200 I reviewed in the October issue of *MT* just might fit the bill: It's small, lightweight, covers AM/FM and two popular SW bands, has a hand crank for power, and costs just \$39. It will play for an hour on 90 seconds of cranking and will take hundreds of crankings on the built-in battery pack so you can just forget about the whole battery issue!



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More On Tobacco Tar Removal

In a previous column we discussed the removal of tar and nicotine from electronic equipment used by smokers. Eddie Bryant, N4UMJ, from Matthews, NC, recalls an effective, ammonia-based detergent called "Microwash" used by the airlines. Following the soak time and cleaning, the parts were rinsed in clean water, then blown dry by a heaterless, high-velocity air stream.

Thanks, Eddie, for the additional hint.

Q. *I saw a circuit designed to keep the initial voltage from spiking when you turned on an old, tube-type radio. It allowed the radio to warm up over the course of a half a minute or so. I can't remember where I saw it, and haven't found anything like it since. Ever heard of anything like that, and is it possible to make one with common parts? (Mike Conway, Merced, CA)*

A. Although I don't recall such an article, many vacuum-tube-radio aficionados do allow a low-voltage, warm-up period to prevent surges from harming various components such as the electrolytic filters whose plates must "form" for a brief period before they can withstand full voltage.

Traditionally, a Variac (voltage-variable transformer) is the elegant approach, but there are other ways to limit warm-up surge current. One such accessory box simply has a wall receptacle and an AC cord and plug attached to it. An AC switch is wired in series with one terminal on the receptacle, and a rectifier diode is soldered across the switch terminals. The rectifier diode should be rated at no less than 200 V, and the current is chosen to handle the maximum current of any radio you might plug in.

When the switch is open, the diode conducts in one direction, effectively allowing the set to warm up at about half voltage. After a desired time, simply close the switch, shorting the diode and allowing full AC voltage into the radio.

Another idea uses a standard AC light socket in place of the diode. By choosing an appropriate 120V light bulb to be screwed into the socket; you can select a variety of warm-up voltages – the lower the bulb wattage, the lower the voltage to the radio during the warm-up period. As with the previous diode circuit, closing the switch allows full 120VAC into the radio.

Q. *Where does a compass needle point at the earth's magnetic south pole? (Mark Burns, Terre Haute, IN)*

A. Believe it or not, exactly the same place! A compass needle aligns itself with the earth's magnetic field, between two points on the earth's surface – the north magnetic pole and the south magnetic pole. So if you are cruising around the Antarctic, your compass needle will still be aligned between the north and south magnetic poles.

The only difference you would note as you approach and cross both poles, however, is that the needle dips downward because the actual magnetic poles are beneath the earth's surface.

Q. *I have a peculiar electrical hum that interferes with radio reception after I turn OFF my fluorescent lights! Any ideas on this one? (Jerry Brookman, AK)*

A. Wow, that's a puzzler! Is the light on a dimmer control? Some of these are notoriously noisy. Try turning off your circuit breaker for the fluorescent lights (assuming this doesn't also turn off your radios) and see if the noise stops. If it does, then you have certainly identified the circuit that's causing the problem. It could be residual voltage energizing defective light bulbs or a bad ballast transformer or starter.

Just to be sure that it might not be some other accessory or a faulty ground, turn the switch back on and successively unplug each electrical cord that's plugged into that circuit. You can check for a faulty ground with one of those inexpensive plugs with little LED indicators, available at many electrical/hardware departments. (See Nov MT p.87)

Q. *As a ham operator I've worked over 100 countries with only 100 watts of power, yet I'm unable to hear 5 kW broadcasters who use enormous antennas. How come? (Email)*

A. The elaborate antenna used by the international broadcasters are not so much for gain as for directivity (which is a result of gain). Many countries are specifically interested in reaching regions other than the US, so they beam their transmissions away from the US in order to reach the other targets. In addition, they may broad-

cast to those other countries at times when propagation to the US is not favorable.

Q. *Is there a nominal optimum length for a random antenna wire to be attached to a shortwave receiver? Should it be quite long, quite short, or what? (Donald Michael Choleva, Euclid, OH)*

A. If you are attaching the wire to an external antenna connector jack provided for that purpose, I would recommend 20-40 feet on a portable to avoid overloading, and 30-70 feet on a tabletop communications receiver with better dynamic range.

If you are attaching it to a portable's telescoping whip, however, I'd limit it to no more than about 5-10 feet to avoid considerable overload from the receiver's built-in antenna preamplifier.

Q. *I'd like to use a car battery with an AC inverter to provide electricity during temporary outages. Are there any safety issues I should be concerned with? (Tyrone, email)*

A. Car batteries contain corrosive sulfuric acid, and they vent explosive hydrogen gas during charging. A few considerations will lower the risks.

- (1) Avoid spills and set the battery where it won't cause damage if some acid leaks out. Sealed batteries are preferable in this case.
- (2) Don't smoke near the battery or allow the possibility of sparks from radio transmitters or electrical switches within several feet. Good ventilation reduces this risk.
- (3) Don't overcharge the battery, although a trickle-charge maintenance of a few amps when not in use is acceptable. Be sure the battery does not get hot (warm is OK).

Questions or tips sent to Ask Bob, c/o MT are printed in this column as space permits. If you desire a prompt, personal reply, mail your questions along with a self-addressed stamped envelope (no telephone calls, please) in care of MT, or e-mail to bobgrove@monitoringtimes.com. (Please include your name and address.) The current Ask Bob is now online at our website: <http://www.monitoringtimes.com>

Getting Started

Bright Ideas

Gary Webbenhurst

P. O. Box 344, Colbert, WA 99005-0344
garywebbenhurst@monitoringtimes.com

Yes, Virginia, there is a Santa Claus. Of course these days, he drives a brown truck and brings the packages to your door. Several of the bright ideas this month are possible stocking stuffers just in time for Christmas! Be sure to photocopy this column, and highlight in yellow your gift wish list. Leave it lying around, and hopefully the family members get the idea. Don't forget to buy yourself a gift. You deserve it!

103

In most of my columns, I advise that you check the "usual list of dealers" for the best price, or in-stock status of any "must buy" items. I mistakenly assumed that all readers knew about these dealers. *Mea culpa*. There are at least a half dozen major dealers, and many more small businesses.

Many of these dealers advertise right here in *MT*. Others can be found in the premier amateur radio magazine, *QST*. This magazine is published by the American Radio Relay League (ARRL). Many dealers take out ads in *QST*, listing their range of products. Even if you not a licensed amateur radio operator, this is great source of information. Large bookstores in urban cities may carry *QST*. ARRL yearly membership is \$39, which includes 12 editions of the monthly magazine. Over 65? Then the cost is only \$34. International, and Canadian memberships are higher. To subscribe, or to order a single issue for \$5, call 1-860-594-0200.

Of course, you are already reading the best monitoring hobby magazine there is! And Grove simply is the best source for scanners and related receiving accessories. Grove Enterprises can be reached at 1-800-438-8155.

104

I own many of the "mini-compact" transceivers. I had always eschewed the manufacturers' special carrying cases. I had found them a little pricey, and not much value. Well, I have changed my stance. The new ones for my Yaesu VX-7R and VR-120 are a perfect fit, and very well suited for the task of protecting the radio. They fit like a glove, and you still have full functionality. For \$12-25, they are worth it. I am in the process of ordering cases for many of my other radios. You can also find some generic swivel cases, and pager holsters (for little radios) at <http://www.galls.com>.

105

There are several wide coverage receivers in the market place. I own two, the Yaesu VR-120 and VR-500. Among their many features is the ability to program alpha labels, e.g., City FD, PD-Tac1, WX Ch1, etc. For ham radio I use a programming strategy that uses the frequency related to the alpha tag. Thus 145.230 is programmed in

Ch 23. 146.620-98 are on corresponding channel numbers, 145.11-49 are on the odd channel numbers. There are also several "Presets" that can be programmed. I elected to program the corresponding TV audio from TV channel 2 to Preset channel 02 and so on. If you have a better scheme, I would like to hear about it.

106

Last month I reported on the unique accessories I found at the SSE website <http://www.ssejim.co.uk>. I have an additional month's use of these items and they are still on my desk-top. I can't say that about all the products I have bought. Let's hope owner Jim Finch will find a US distributor for these solidly made scanner stands and antenna products.

107

Drink cup holders and coffee mugs work great for holding pens, small tools, and various rubber duck antennas. Your monitoring station is not complete without specialized rubber ducks for VHF aircraft band and those weak 800 MHz signals. You can order a set of impressive CIA and KGB coffee mugs (item#200491-SET) for \$16.90 at 1-800-442-0002 or <http://www.sovietski.com>. ARRL mugs are available at 1-888-277-5289- or <http://www.arrl.org/catalog/>. Also worth a quick look are their books, ARES patches, and even sportswear. The *ARRL Repeater Directory 2002-2003 Edition* is very helpful and still pocket sized. This is also on CD ROM.

108

Column reader Chuck in New York wrote with a follow-up to a previous bright idea. I had extolled the usefulness of cheatsheets. These are one-page summaries of the significant information necessary to operate your radio. Chuck requested that I reduce the one page sheet to a 3x5 card. By removing the tables with programmed limit searches and keypad functions, I accomplished his request. You can make up your own cheatsheet with either a full page or just the basic options. For the 3x5 card, use your word processor to create a table with one column and two rows. Use the top and side rulers in your editing screen to size the table for the correct cut-out size. You can even use the Format key, then Borders, and Shading, to select a dotted border as an aid to "cut along the dotted line." If you can read small 8-point typeface, you can cram a lot in the card, but try 10 or 11 point size first. You can also use the back. Of course, the finished product can be laminated in plastic for lasting endurance. Can't get it laminated? Use several strips of clear Scotch tape to cover the entire surface.

109

I could not take it anymore. I was running out of desk space and electrical outlets. I have several radios, and naturally several battery chargers. I made up some custom power cords for my battery chargers that take 12 volts. I then used a small 3 amp power supply to power all seven chargers. This saves an ugly mess of wall warts. Why didn't I think of this sooner?



110

As Uniden and Radio Shack gear up for the next generation of scanners, no doubt the current ones will soon be on sale. Get your credit cards ready. The Radio Shack Pro 92 and Pro 93 are being closed out at \$169. I think I originally paid \$300 for my Pro 92. This scanner will go down in the logbook of radio history as a breakthrough.

111

Have you been a very good boy or girl? Well, drool over this one. The Yaesu VR-5000 is on sale for \$589 at Grove. This is a saving of \$300 off the usual price. I think I need one. No you don't. Yes, I do. No, you don't. Yes, I want one. Guess who won? Where is that darn credit card I hid?

112

What? You don't have the new edition of *Police Call*? Look no further than Radio Shack or Grove Enterprises.

113

Still looking for a stocking stuffer? Try Sporty's Pilot shop at 1-800-LIFTOFF or <http://www.sportys.com/shoppilot/>. They have many accessories that are useful in the monitoring hobby.

Well, the holidays are upon us. I trust you are smart enough to turn the radios off while hosting friends and family. I have a long list of bright ideas and hope you are looking forward to the New Year. I am.

Three Specialties; Three Services

We close out 2002 by catching up with Dr. Mark Levine, son of "Gramma in Florida," Mrs. Eileen Levine, our featured hobbyist in the September issue of *MT*. Mark provides us with a fascinating history of the politics and equipment of the emergency medical rescue field, and his professional journey from being an ambulance technician to a Doctor of Chiropractic.

◆ Who's Listening? Mark Levine

Mark Levine was about 13 years old when he first became interested in communications. Citizens Band was the only choice at the time, and it served to foster his interest in electronics and radios.

But, Mark and his friends quickly outgrew the short range and free-for-all atmosphere of CB. They learned that true "communications" required better equipment and a more structured operating environment. By age 16, that meant Amateur radio. He obtained his Novice license and quickly progressed through General and Advanced classes.

Now solidly within the Amateur community, Mark was exposed to new equipment, operating parameters, and the roles and responsibilities of proper radio usage. He was also seeing firsthand how radios were used in a professional capacity, since many Amateur operators were also involved in local public safety agencies. When not talking on the Amateur bands, Mark was listening to NYPD and other agencies that he could tune in on his VHF handheld radio. And listen he did ... at home, at school, and everywhere in between!

◆ From Ambulances to Rescue Units

One group in particular caught his attention: the local volunteer ambulance corps. This public safety function became Mark's number one goal and started a lifelong interest in health care and the first-response functions of local agencies. Soon after his eighteenth birthday, Mark passed the New York State Emergency Medical Technician (EMT) test and began working at Lenox Hill Hospital in Manhattan.

In those low-tech days of the early 1970s, major hospitals often operated or sponsored a community's ambulance system. Local government agencies had a variety of roles, depending upon the

individual jurisdiction, and may have included the operation of first-response agencies or just a detached administrative control of ambulance operating standards.

Mark followed the evolution of first-response issues and watched how some jurisdictions kept it privatized, while others made it a new function of police or fire departments. Another option was sometimes chosen: the creation of an entirely new department to handle the tasks related to first-response medical treatment. And, to add yet another variable to the mix, some jurisdictions separated the first-response medical function from the subsequent patient-transportation function.

While all of these issues were being played out in jurisdictions across the country, and immortalized in the hit television show *Emergency* which ran from 1972 to 1977, Mark continued with his work and training in New York. He became one of the first paramedics and transferred to Beekman Downtown Hospital and later, to Saint Vincents Hospital.

It was at Saint Vincents that an entirely new program was being developed: the first mobile coronary care unit in the United States. This is certainly hard for us to imagine today, but mobile health care had a very difficult infancy. The first major advance beyond patient transportation via ambulance, was to actually put doctors in the ambulances. With this step, patients could be evaluated and treatment could be initiated well before the emergency room was reached.

◆ The First Paramedics

The paramedic program sought to replace doctors with medically trained first-responders and, eventually, to put paramedics on every ambulance or "rescue" unit. This proposal, however, raised many fears and had broad effects on the medical, legal and local government sectors. How could paramedics replace doctors? How could they administer drugs? What if something went wrong?

We now place our trust in these professionals daily, but back then Mark and his co-workers had an uphill battle. They set out to prove that with the right training and equipment, lives could be saved many miles away from the emergency room. Interestingly, one of the first problems they encountered was with E.R. nurses. For the first time ever, nurses had to accept a patient's medical evaluation and treatment provided by someone other than a doctor.

"We could do everything an E.R. could do," Mark recalled. "It took time to gain the confidence of nurses who had never seen these procedures completed without a doctor."

Mark not only gained the confidence of the local medical community, he was often the sole paramedic on duty during the midnight shift. If you needed any medical help in New York City during those early years, Mark was your lifeline. Compare that to recent events and you'll see how far we've come in terms of personnel and specialization.

"We had Motorola Micors and the Motorola Modat for remote signaling," Mark advised in terms of radios. "We had a push-button call status system, but it never worked right. The signaling was on the same frequency and PL as the voice, and it was just too much of a conflict." Motorola Apcor medical telemetry radios and Lifepak cardiac monitors were also in use; this was pretty much a standard throughout the industry.

Unlike the scenes in the *Emergency* television series, though, the transmission of EKG's by radio took time and technology before everything worked smoothly. Mark saw the transition from individually-licensed VHF ambulance channels being used for voice and data to the dedicated MedCom UHF



Dr. Mark Levine, WB2EQE, and emergency medical communications grew up together; he's seen it all.



A display of the agencies with which Mark is proud to have served.

channels. "We rarely sent an EKG by radio at first...it was very difficult," Mark said. "We would end up just reading the EKG and advising the E.R. what we saw."

Since the voice radios were mounted in the ambulances, a paramedic had no 2-way communication when responding to a scene away from the vehicle. "There were no portables and no payphones in some neighborhoods," according to Mark. To satisfy that need and to increase his own personal safety when in a bad neighborhood or dangerous site, Mark bought himself a General Electric PR25 two-channel portable radio. Outfitted with the ambulance frequency and a police frequency, he was "wireless" back in the 1970s!

◆ The Third Public Safety Service

By 1980, Mark's family had moved to Florida and he started working for the Broward County Emergency Medical Services Division. The paramedic program was now an accepted function of local government on a near-nation-wide basis, and paramedics were now highly-trained medical rescue specialists. The industry had grown from a transportation service (ambulances) to a medical stabilization service (Basic Life Support or BLS), and was moving toward the Advanced Life Support (ALS) and rapid deployment roles that would be realized in the 1990s.

In Broward County (Fort Lauderdale), three distinct public safety services were operated: the Sheriff's Office, the Fire Department and the Emergency Medical Services Division. General Electric PR25s and later, Motorola MT500s were used by EMS staff. The MedCom UHF system was in place for dedicated communications with each hospital. A few years later, some jurisdictions replaced or supplemented MedCom with subfrequencies on new 800 MHz trunked systems.

"MedCom really became obsolete," according to Mark. "This was not expected. In fact, no one ever realized that field crews (paramedics) would become so competent and proficient. We really didn't need to be in constant contact with a doctor back at the hospital."

Later in the 1980s, Mark began teaching the Associate Degree Paramedic program at the local community college. He also developed his belief that three distinct services are better than combining EMS with Fire or Police services. Mark believes that EMS training is so specialized and so unique that any combination, such as the Fire-Rescue Departments most often seen around the country, are really compromise programs.

Just as law enforcement and firefighting are individual professions, so, too, is mobile emergency medicine, in Mark's opinion. "Cross-training is not always a good thing. Would you feel safe if the person administering an I.V. line had last performed this same procedure two weeks ago...or longer?" Unless a local Fire-Rescue team has the benefit of constant callouts and near full-time medical rescue work, they may be much more competent at dealing with fire lines and water pressure than I.V. lines and blood pressure.

◆ The End of Shift Work

After teaching for a time and not getting a desired promotion to EMS Supervisor, Mark decided to look for a new job or a new location. His wife, also a paramedic, was similarly tired of the shift work and conflicting schedules she shared with her husband.

Mark decided on chiropractic medicine after being treated for an injury, and he pursued this track full-time. He obtained a Bachelor of Science degree in Human Biology and became a Doctor of Chiropractic in 1989. In 1990, he opened the Levine Chiropractic Center in Torrington, Connecticut. As a Chiropractic Physician, Mark stays busy with his patients and his radio hobby. He's also found time to co-

author a paper published in the *American Journal of Chiropractic Medicine*, he's served as the Director of Emergency Management in New Hartford, Connecticut, and he has been a Volunteer Examiner for the American Radio Relay League in Newington, Connecticut.

Mark's wife also went back to school to obtain her Masters Degree. She is an Advanced Practice Registered Nurse (APRN) in Clinical Oncology and also an Amateur Radio operator.

◆ The "Levine Museum" of Radio Hardware

Mark's current home equipment inventory includes an AOR AR1000xlt, Radio Shack PRO-93, Uniden BC148, Uniden BC220xlt and Uniden 780xlt, plus HTs including a Yaesu VX5-R, Icom IC-2SRA, Kenwood TH-F6A, Motorola GP300 and Motorola FRS 289, plus a Yaesu FT-990 HF with Timewave 599zx digital noise filter and Command Technologies' Commander-2500 amplifier.

He has a Coaxial Dynamics directional wattmeter, and runs his radios from a Rohn 45g 60-foot tower mounted at 800 feet above sea level. As for antennas, how about "an Austin Ferret for scanning, plus a Force 12 model 4BA (10, 12, 15, 17m ham) and Force 12 420/240 (4 elements on 20m, 2 on 40m) with 44-foot elements on a 30-foot boom!"

"All available radios that can be computer programmed or controlled are interfaced with a Windows XP computer with a 21 inch NEC monitor," Mark reports, and he's "anxiously awaiting the new digital scanners to monitor the CT State Police on the 800 MHz Astro Trunked statewide system."

But, the inventory doesn't stop at his property line. In the car, Mark runs a Yaesu FT-8100r remote mounted into an Austin Spectra antenna. At the office, he listens to a Uniden BC895xlt with discriminator tap and data slicer.

◆ Primary Listening Targets

Mark's primary frequency list keeps it simple:

33.7000	Litchfield County Dispatch
154.1450	Torrington Fire
154.1750	Naugatuck Fire
154.1900	Farmington Fire
154.3100	Hartford Fire simulcast of 800 trunked EDACS system
155.1075	Litchfield County Dispatch
155.2950	New Hartford Ambulance
155.8950	Town of New Hartford
461.0750	Campion Ambulance
856.7375	Torrington PD

Mark uses Jim Fordyce's webpage as "one of the reference sources I use for finding freqs up here in New England."

<http://www.fordyce.org/scanning/frequencies/Connecticut/litchfield.html>

Other websites of interest from this column:

Litchfield County Dispatch Center: <http://www.lcd911.com/>
Coaxial Dynamics meters and equipment: <http://www.coaxial.com>
Timewave digital noise filter: <http://www.timewave.com>
Command Technologies amplifiers: <http://www.command1.com>

West Coast Railways

One of the most beautiful roads in Canada has to be the Sea to Sky Highway stretching from North Vancouver up to ski country in the Whistler-Blackcomb resort area in the Coast Mountains of British Columbia. We will make a stop in Whistler to monitor the ski slopes next month, but this month we will work our way along the southern part of the BC Rail line that follows the highway.

The BC Rail line and the highway leave North Vancouver and travel through West Vancouver, with its exclusive residential neighborhoods. The "British Properties" are found on the hillside here. They were so named because residency was once reserved for British citizens. A little further along the shore of English Bay, the road and rail lines take a turn around the end of the point into Horseshoe Bay.

This picturesque little community is the mainland terminal for BC Ferries ships to Nanaimo on Vancouver Island. Horseshoe Bay is a good spot for pulling out a scanner and checking marine and other frequencies (see Table 1). Parking is tight here and the highway can get congested during peak travel periods. Ferry traffic is sometimes lined up on the highway itself if the ferry approach roads are full. Sometimes the best plan is to travel with a magnetic mount roof antenna and monitor from the highway if going by car. Of course if you are traveling by train you can relax and listen in comfort.

**Table 1: Frequency Monitoring List for
Horseshoe Bay Ferry Terminal**

Department of Fisheries and Oceans - Canadian Coast Guard
148.525
BC Ferries
155.9100 458.1125 458.6375 460.0875
City of West Vancouver Fire Department
158.970

At the top of Howe Sound lies the small town of Squamish. Since *Scanning Canada* is exploring the railroad and its destinations, we should mention a local attraction. It is worth a small diversion off the highway to visit the West Coast Railway Heritage Park. You have to cross the BC Rail line to reach the park and when *ScanCan* last visited the area in the summer of 2002, one of the sights that caught my attention was a massive snow plow in summer stor-

age near the railroad crossing (see picture). Winters must be bad up in the mountains!

To find out more about the railway heritage park visit their website at <http://www.wcra.org> and scan the frequencies listed in last month's column for activity on the rail line. For other frequencies of interest in Squamish see the listing in Table 2.

**Table 2: Frequency Monitoring List for
Squamish, BC**

BC Ambulance Service - Squamish
142.095 149.110 149.680
Squamish District Fire Dept
149.495 149.525 154.250 155.460 158.670
159.180 162.270
Department of Fisheries and Oceans - Canadian Coast Guard
149.495 143.265 148.255 156.425 156.450
156.475 156.925 156.950 156.975 157.100 161.575

❖ Sad News for Toronto Airport Monitors

For several years the folks at the Boeing factory on Airport Road in Mississauga, Ontario, have graciously allowed the general public to park on an unused portion of their parking lot to watch arrivals and departures at Toronto's Lester B. Pearson International Airport. *ScanCan* has passed many a happy lunch hour with scanner in hand listening to Toronto Tower while munching on a sandwich. All that

came to an end in September this year when *ScanCan* arrived for his usual midday break and was asked to leave the area by security. At first I thought this must be something to do with the September 11th anniversary. However, a couple of days later the heavy equipment arrived and the paving was torn up and removed.

I believe that this work is being done in preparation for construction of the new runway 23R/5L. The Ontario government has invested a lot of money in enlarging and improving what is already Canada's largest airport. Major construction of approach highways, a massive new terminal and new runways is underway. The new runway configuration will provide four east-west runways (including two new ones) as well as the two north-south runways already in use.

The popular Boeing lot attracted a lot of scanner owners and similar radio enthusiasts. The Ontario license plate "DX SWL" was a daily visitor. Now sadly we must all try to find other places to relax and listen to ATC traffic. There was talk of a viewing area on top of one of the terminals, but the events of 9/11/2001 may have discouraged that idea.

If you are in the Pearson Airport area and see a car with the call sign license plates "VA3KOT" parked at the side of the road, come and say hello.

❖ Reader Challenge

During frequent travels throughout Canada, *ScanCan* has come across more than a few signs that seem to be planted for the benefit of scanner radio enthusiasts. These signs post local radio frequencies. Some are large and some are small and inconspicuous. So *ScanCan* has a challenge for readers: go out and hunt down some more of these signs. If you can verify the frequency, all the better. Take a photo and send your pictures to *Scanning Canada* c/o MT or via the e-mail address at the top of the column. The best ones received will be published here in the column.

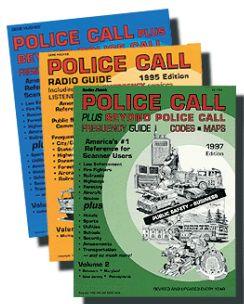
❖ Seasons Greetings

Finally, *Scanning Canada* wishes to thank all its loyal readers (from both sides of the border) for their contributions to the column over the past year. Best wishes for the holiday season and we look forward to joining you all again next year.



Giant BC Rail snow plow rests for the summer

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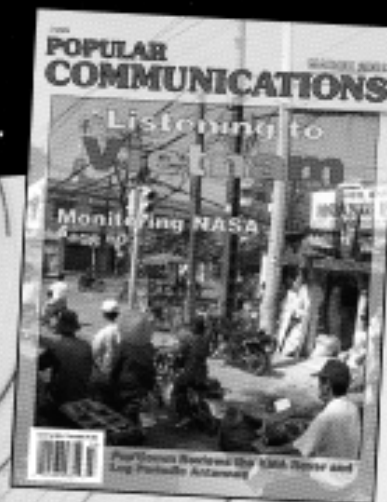
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Slot Machine Stations: We Found the Casino!

One of the most nagging mysteries in the shortwave utility hobby is solved. The Slot Machines are Japanese Navy.

Some of our veteran readers might remember the discovery about three years ago of these distinctive-sounding stations. Anyone who heard them once was determined, from that moment on, to figure out just what the heck was making all these weird noises.

And weird it is. Its many frequencies play the same discordant little "song," in absolutely perfect sync with one another. All this noise sounds like a broken video game, or, better yet, one of those Nevada gambling machines, happily spinning its reels on the way to taking your money. This Vegas reference stuck, to the point where the thing was given the code name "XSL" (Slot Machine Oddity) by the "numbers" hobbyists in the European Numbers Information Gathering and Monitoring Association (ENIGMA 2000).

The first XSL discoveries were made in the maritime bands – not the most logical place to find complex signals. Maritime bands are allocated for narrowband voice and teleprinting signals, or the even more narrow Morse code, but these signals take up quite a bit more bandwidth. They use what looks like six unevenly spaced audio tones in multitone phase shift keying (MPSK). The signal is kind of distorted, with heavy intermodulation between the tones. Eleven times a second, all tones interrupt, or phase-reverse, or do something equally bizarre.

In the United States, the best frequencies to find the slot machine signal are 4231.5, 4291, 6417, 6445.1, 8588, and 8704 kilohertz (kHz). These appear to be intended as wide-coverage frequencies, always on, and coming and going with the skip. While they're loudest around the Pacific Rim, reports have also come from Europe and Africa. Tune them as if they were up-per sideband (USB).

Early on in the investigation of this weird station, a position fix indicated Japan as the source. It was a reliable fix by people understanding the fine points of high-frequency direction finding, but one learns fast in this hobby that nothing is ever 100 per cent certain. Therefore, China and Russia were also suggested as origins.

Another clue came, however, when a listener checked the frequencies against those formerly used for a different eight-tone radio modem by the Japanese Navy. Several were so close

as to be probably identical in assigned center frequency; also the Japanese had dropped use of this modem on some of these frequencies at about the right time.

Finally, the best evidence came from several utility fans that traveled to Japan. They reported local signal characteristics on many additional frequencies, some of which were part time and were being turned on and off as opposed to fading in and out. When the Japanese loggings are added, the full list becomes as follows:

3058 3075 4152.5 4231.5 4291 5643 6249.5
6417 6445.1 6500 6693 6768 8312.5 8588
8704

So what does the Slot Machine really do? Well, as so often happens in HF utility, the secret is in what you *don't* hear. When the music stops, the remaining, hissy bursts are obviously high-speed MPSK data. These, in fact, are the reasons for this whole expensive operation. Our slot-machine song thus becomes no more than an idle state, perhaps a synchronization sequence for cryptography.

And what encrypted data is being passed? The people who know aren't telling. It could be weather charts (by fax). It could be just about anything. We'll leave that part up to the military column.



❖ South Bound II Still On

One of the better-known utility stations is usually just called "Herb." When he transmitted from Bermuda, out in the North Atlantic, his vessel tracking and weather service was easy to hear all over the US. When he moved to Canada in 1994, he disappeared from our radios on the West Coast. Many of us were wondering if he had packed it in after fifteen years of eight-hour days in his radio room, gathering and giving out his free information.

Well, your vacationing editor can attest that Herb Hilgenberg, also identifying as VAX 498 and "South Bound II Coastal," still gets a perfectly respectable signal into New York City. He's still on his traditional frequency of 12359 kHz USB, also known as channel 12C, with the presence that has earned him the nickname of "ghost crew member."

Herb's original station, at his home aboard the small sailboat in Bermuda, was quite a sight to behold. Computers, printers, and radios jammed every inch afloat, while satellite dishes and antennas lined the dock. The boat has since given way to a basement radio shack, accounting for the "Coastal" callsign suffix.

Herb originally got interested in weather forecasting after an erroneous government prognostication nearly caused the loss of his sailboat with his entire family aboard. He decided to study meteorology and try to improve on the information available to small vessels on extended North Atlantic voyages. Improve he did, and when he decided to help out another sailor at sea, his weather info was so good that soon everyone else wanted his help as well.

The result, in 1987, was the radio net we still hear today. He listens for calls at 1950 coordinated universal time (UTC). At 2000, the formal roll call begins. It can last for hours in the busy season, and it can become very interesting for landlubbers if a hurricane is about.

Everyone gets a position check and a detailed weather forecast generated from many different sources. This is the only shoreside contact some people have, and Herb has called authorities for more than one rescue.

While the North Atlantic, Caribbean, and Gulf of Mexico are primary, limited coverage is also given the South Atlantic. Some attempts have even been made with the Eastern Pacific, propagation permitting. Alternate frequencies are 8294 kHz (channel 8A) and 16531 (channel 16B).

As Herb says, "Have a good watch" until next month.

ABBREVIATIONS USED IN THIS COLUMN

AFB	Air Force Base
ALE	Automatic Link Establishment
AM	Amplitude Modulation
ARQ	Automatic Repeat Request teleprinting system
CAMSLANT	Communication Area Master Station, Atlantic
CIA	US Central Intelligence Agency
CW	Morse code telegraphy ("Continuous Wave")
DEA	Drug Enforcement Administration
DSC	Digital Selective Calling
E4	UK "numbers" with Cherry Ripe folk tune
E5	CIA, English test count and 4-number groups
E10	Israeli phonetic English female "numbers"
E10a	E10 callup with "2," then no message
EAM	Emergency Action Message
FAX	Radiofacsimile
FACSFAC	Fleet Area Control & Surveillance Facility
FEC	Forward Error Correction teleprinting system
GHFS	US Air Force Global High-Frequency System
HFDL	High-Frequency Data Link (air digital system)
M8	Cuban CW, "cut numbers" ANDUWRIGMT
M8a	M8 format with three equal messages
M16	8BY; French Intelligence CW "numbers"
M22	4XZ; Israeli Navy CW "numbers"
Meteo	Meteorological
MFA	Ministry of Foreign Affairs
Navtex	Navigational Telex
PACTOR	Packet Teleprinting Over Radio
PSK	Phase-Shift Keying
PR	Puerto Rico
RSA	Republic of South Africa
RTTY	Radio Teletype
SHARES	Shared Resources (US government)
SITOR-A	Simplex Teleprinting Over Radio, ARQ mode
SITOR-B	Simplex Teleprinting Over Radio, FEC mode
UK	United Kingdom
Unid	Unidentified
US	United States
V2	Cuban female, starts "Attention" in Spanish
V2a	V2 format with three equal messages
V21	Cuban Spanish male "Babbler" numbers
VOLMET	Aviation weather broadcast

All transmissions are USB (upper sideband) unless otherwise indicated. All frequencies are in kHz (kilohertz) and all times are UTC (Coordinated Universal Time). "Numbers" stations (encrypted, usually unidentified, broadcasts thought to be intelligence-related) are identified in () with their ENIGMA station designators, as issued by the European Numbers Intelligence Gathering and Monitoring Association.

- 518.0 "E"-Niton Radio, UK, with SITOR-B Navtex warnings, new time and identifier, at 1640. (Day Watson-UK)
- 4017.0 Cuban "Atencion;" AM "numbers" (V2), at 0319. (Camillo Castillo-Panama)
- 4027.0 Cuban "Atencion;" AM "numbers" (V2a), at 0301. (Castillo-Panama)
- 4210.5 IAR-Rome Radio, Italy, with SITOR-A markers, also using 4216.5, at 0352. (Ken Maltz-NY)
- 4316.0 NMG-US Coast Guard, New Orleans, LA, with marine weather forecasts at 0359. (Maltz-NY) [Relays CAMSLANT. -Hugh]
- 4320.0 IAR-Rome Radio, CW marker at 0418. (Maltz-NY)
- 4360.0 CIO 30-Abnormal Israeli "numbers" callup (E10a), simulcast 5339, at 2052. Changed to CIO 10 (also abnormal), simulcast 5339 and 7812, at 2130. (Ary Boender-Netherlands)
- 4372.0 Giant Killer-US Navy FACSFAC, VA, in area tracking link coordination with many stations, at 0010. (Mark Cleary-SC)
- 4479.0 Cuban "Atencion;" AM "numbers" (V2a), at 0301. (Castillo-Panama)
- 4495.0 Monogram-US military, with EAM simulcast on 6697, 8992, and 11244, at 0204. (Jeff Haverlah-TX)
- 4584.0 Unid-English fishing boat chatter, at 0015. (Barry Williams-AL)
- 4739.0 Fiddle-US Navy, FL, surveillance with Tudor 47 at 0037. (Cleary-SC)
- 4893.0 Unknown-E10 in progress, also on 9130 and jammed on 6930, at 0235. (Williams-AL)

- 5255.0 Unknown-CW station repeating "357," at 0257. (Williams-AL)
- 5275.0 A1A-US Army National Guard, calling B6D in ALE, at 1944. (Watson-UK)
- 5320.0 US Coast Guard Group, Mobile (AL), working an unknown cutter at 2354. (Cleary-SC)
- 5399.0 GANTSEC-US Coast Guard Greater Antilles Section, tracking a go-fast boat with Coast Guard 1713 and vessel Shark 02, at 0419. (Cleary-SC)
- 5418.0 Cuban "Cut Number" CW station (M8a), twice at 0300. (Castillo-Panama)
- 5450.0 MVU-UK Royal Air Force VOLMET, continuous air weather, parallel on 11253, at 0436. (Maltz-NY)
- 5505.0 Shannon VOLMET, Ireland, European air weather at 0447. (Maltz-NY)
- 5616.0 Shanwick-Atlantic Air Traffic Control, Ireland, working aircraft, also using 5649, at 0250. (Williams-AL) Shanwick, working several aircraft at 0605. (Herbert Newberry-GA)
- 5696.0 CAMSLANT-US Coast Guard, working Coast Guard 2113, at 0054. (Cleary-SC) CAMSLANT telling CG 1718 (a C-130) to meet Cutter Drummond for a pursuit, at 0250. (Allan Stern-FL)
- 5759.0 Cuban "Cut Number" CW station (M8a), 4 times at 0200, once at 0301. (Castillo-Panama)
- 6415.0 7TF4-Boufarik Radio, Algeria, CW marker at 0553. (Newberry-GA)
- 6529.0 "The Babbler"-Very weird Cuban "numbers" station (V21), in Spanish at 1235. (Stern-FL)
- 6604.0 New York VOLMET, air weather, also 13270, at 1940. (Newberry-GA)
- 6627.0 Gander-Air traffic control, Canada, working aircraft at 0550. (Newberry-GA)
- 6640.0 New York Radio, working a medical emergency aboard Jet Blue 508, at 0810. (Stern-FL)
- 6697.0 Paid Off-US military, with 28-character EAM, simulcast 8992, at 0526. (Haverlah-TX)
- 6779.0 PCN6-Unknown CW station calling 9Q8P and Y1L, at 1840. (Watson-UK) [Freq is usually German Navy voice. -Hugh]
- 6797.0 Cuban "Cut Number" CW station (M8a), twice at 1200, once at 1304. (Castillo-Panama)
- 6825.0 Cuban "Cut Number" CW station (M8a), at 1200. (Castillo-Panama)
- GYA-UK Royal Navy Arabian Gulf service, Northwood, with FAX weather charts at 1855. (Watson-UK)
- 6834.0 GYA- UK Royal Navy Arabian Gulf service, Northwood, fuzzy FAX charts at 0643. (Watson-UK)
- 6840.0 NYZ-Unknown station with CW marker at 2124. (Watson-UK)
- 6854.0 Cuban "Atencion;" AM "numbers" (V2a), 3 times at 0300. Cuban "Cut Number" CW station (M8a), twice at 1200. (Castillo-Panama)
- 6866.0 Cuban "Cut Number" CW station (M8a), twice at 1200, once at 1300. (Castillo-Panama)
- 6912.0 CIO2-Israeli intelligence, callup only (E10a), in AM at 0045. (Williams-AL)
- 6930.0 VLB2-Israeli intelligence, callup only (E10a), in AM at 0045, 0247, and 0345. (Williams-AL) VLB 30-Abnormal Israeli "numbers" callup (E10), at 2052. Added simulcast on 4015 and 5170 at 2152. (Boender-Netherlands)
- 6933.0 Cuban "Cut Number" CW station (M8a), at 1300. (Castillo-Panama)
- 6950.0 US CIA "Counting Station" (E5), callup for "246," simulcast 7585, at 2100. (Boender-Netherlands)
- 6970.0 US CIA "Counting Station" (E5), callup for "385," simulcast 8110, at 2100. (Boender-Netherlands)
- 6981.0 Cuban "Cut Number" CW station (M8a), twice at 1200. (Castillo-Panama)
- 7657.0 Panther-US DEA, Nassau, Bahamas, working 24C and 60A, drug mission at 2332. (Cleary-SC)
- 7889.0 Cuban "Atencion;" (V2), AM in progress at 0225. "Cut number" CW station, bad keying at 0220. (Castillo-Panama)
- 8085.0 US CIA "Counting Station" (E5), callup for "246," simulcast 9219, at 1900. (Boender-Netherlands)
- 8103.0 4XZ-Israeli Navy, Haifa (M22), CW marker at 1555. (Watson-UK)
- 8220.0 522-Israeli Air Force, working BB2 in ALE, at 2019. (Patrice Privat-France)
- 8396.5 UCKU-Russian Motor Vessel Fedor Varaksin, SITOR-A working UCE, Arkhangelsk, at 1300. (Privat-France)

- 8415.0 UCJC-Russian vessel *Dimitry Pojarskii*, calling another vessel in DSC, at 1633. UCKC-Vessel *Emel Pougatchev*, calling UDAL, Volgograd, DSC at 2032. (Watson-UK)
- 8499.7 VTP1/5/7-India Navy, Bombay, English RTTY weather for Arabian Sea, at 1740. (Bob Hall-RSA)
- 8652.0 GYA-UK Royal Navy, Northwood, Arabian Gulf service FAX at 0635. (Watson-UK)
- 8764.0 NMN-US Coast Guard CAMSLANT Chesapeake, VA, with "Perfect Paul" synthesized Atlantic weather, at 0600. (Newberry-GA) CAMSLANT, working NQSP (Cutter Vigorous) at 2357. (Cleary-SC)
- 8912.0 Panther-US DEA, Nassau, in a go-fast pursuit with 19C, at 2157. (Cleary-SC)
- 8942.0 SU0315-Aeroflot flight working Shannon in HFDL, at 1515. (Privat-France)
- 8971.0 Uniroyal 01, ops-normal for Bluestar (USN, PR), at 0047. Fighting Tiger 21-US Navy, calling Goldenhawk (Brunswick, ME), at 0151. (Cleary-SC)
- 8980.0 CG 1713-US Coast Guard, patch to District 7 Miami Ops in a search for a missing plane, at 2150. (Cleary-SC)
- 8983.0 CAMSLANT-US Coast Guard, VA, working Army 26593 at 1329. CAMSLANT, in a search for migrant rafts with Coast Guard 1713, at 1757. (Cleary-SC) CAMSLANT, working CG Rescue 1720 on a search and rescue mission, at 2016. (Stern-FL)
- 8992.0 Offutt-US Air Force, NE, with a 28-character EAM at 0203. (Haverlah-TX) Offutt, with EAM "for Maurice Charlie," simulcast on 11175, 11244, 13200, and 15016, at 2243. (Cleary-SC)
- 9006.0 Puerto Rico-US Air Force GHFS, Salinas, working Fendi 01 after trying several other frequencies, at 0551. (Haverlah-TX)
- 9016.0 Delicate-US military, with a 28-character EAM, simulcast 8992 and 11244, at 1953. (Haverlah-TX)
- 9373.0 RMP-Russian Navy, Kaliningrad, calling P98R in CW, at 1519. (Watson-UK)
- 10075.0 Cedar Rapids Radio, IA, working United 855, told aircraft to use 17940, at 0328. (Stern-FL)
- 10152.5 SPD-Unknown station, working 27R in ALE, at 1353. (Watson-UK)
- 10215.0 HZN48-Jeddah Meteo, Saudi Arabia, RTTY weather at 1458. (Watson-UK)
- 10242.0 Unid-US Customs, ALE sounding, also using 11494, at 0316. (Cleary-SC)
- 10248.0 8BY-French intelligence, Paris (M16), with CW callup and message, at 1741. (Watson-UK)
- 10334.7 Unid-Egyptian diplomatic, with message and Arabic chatter in SITOR-A, at 1517. (Watson-UK)
- 10715.0 AMC5-Chinese diplomatic, with Chinese voices, then ALE-initiated PSK messages at 1945. YT62A-Chinese diplomatic, working YT201A in ALE at 1953. BXT78-Chinese, PSK traffic at 1956. (Watson-UK)
- 10780.0 Razor 66-US Air Force, evidently an E-8C (from traffic), in a patch via Cape Radio, FL, to Robins AFB for information on a tanker, at 1612. (Larry Van Horn-NC)
- 10871.9 "S"-Russian Navy, Arkhangelsk, CW single-letter channel marker, at 1849. (Watson-UK)
- 10875.0 BMLV2-Austrian Ministry of Defense, Vienna, calling 21111 in ALE, at 1045. Same station with ALE-initiated RTTY message at 1100 and 1330. (Watson-UK)
- 11076.0 Panther-US DEA, Nassau, working an unknown Coast Guard aircraft, at 2232. (Cleary-SC)
- 11175.0 JW510-US Navy C-130T, GHFS patch to Jacksonville, at 0001. (Cleary-SC) Doom 62-US Air Force, with ops-normal for McClellan Global, CA, at 1752. Fendi 01-Probable US military, in a patch with Lajes Field, Azores, then requesting a discrete working frequency, finally moved to 15087 by Puerto Rico, at 1851. (Haverlah-TX)
- 11181.0 200171-US Air Force C-17, sounding in ALE, at 1154. (Watson-UK)
- 11202.0 CAMSLANT-US Coast Guard, in a drug operation with Coast Guard 24C, at 1419. (Cleary-SC)
- 11244.0 Overflow-US military, with two 28-character EAMs, simulcast 8992, at 2255. (Haverlah-TX)
- 11330.0 New York-Caribbean air traffic control working several aircraft at 1934. (Newberry-GA)
- 11565.0 EZI-Israeli intelligence "numbers" callup and message (E10), at 0300. (Newberry-GA)
- 12161.7 Unid-Algerian customs service, Algiers, with PACTOR exchange-rate traffic in French, at 1451. (Watson-UK)
- 12359.0 VAX 498-Herb Hilgenberg's *Southbound II* daily weather net, passing tropical information to an unheard vessel, at 2036. (Hugh Stegman-NY)
- 12532.5 TCPB-Motor Vessel *Mehtap Bayraktar*, SITOR-A with Istanbul, at 1200. (Privat-France)
- 12603.5 SVO-Athens Radio, with SITOR-B news in Greek, at 1310. (Privat-France)
- 12639.5 OST-Oostende Radio, Belgium, with SITOR-A marker at 0505. (Maltz-NY)
- 12710.7 PWZ33-Rio de Janeiro Radio, Brazil, English RTTY navigation warnings, at 1917. (Hall-RSA)
- 12877.5 UIW-Kaliningrad Radio, Russia, with RTTY weather in Russian, at 1531. (Hall-RSA)
- 12984.0 VNG-Supposedly deceased Australian CW time signals, good signal at 1200. (Newberry-GA) [Latest projected closing date is end of 2002. -Hugh]
- 13243.0 Unid-repeating signal with two rising, then two falling tones, on for hours after 1951. (Tom Severt-KS) [Probably a SHARES digital gateway station, though purpose of this particular transmission is unknown. -Hugh]
- 13927.0 AGA2PA-US Air Force MARS, Patrick AFB, CA, patching Coast Guard 603Z and Razor 33, went to 20992.5 (unheard there), at 1830. (Newberry-GA) Teal 27-US Air Force Reserve 53rd Weather Recon "Hurricane Hunter" WC-130, reporting arrival time in a patch to forward base in US Virgin Islands. Teal 22, patch to Cable News Network, as the aircraft approached the eye of Isidore, at 2210. Teal 91, telling unknown station that Isidore had reached category 4, at 2213. Teal 55, patch to National Geographic as aircraft entered Isidore's eye, at 2355. (Stern-FL) Cody 01, MARS patch at 2305. (Cleary-SC)
- 14404.0 S00-Swedish MFA, Stockholm, calling S72, Kinshasa, in ALE at 1935, 1944, 1952, and 2011. (Watson-UK)
- 14867.7 qkwthk-Egyptian Embassy, Djakarta, Senegal, with ARQ message to Cairo MFA, at 1605. (Hall-RSA)
- 14982.8 RBV76-Tashkent Meteo, Russia, with clear FAX at 1619. (Hall-RSA)
- 15025.0 CO0071-Continental Airlines flight, HFDL position for Iceland at 1623. (Privat-France)
- 15087.0 Puerto Rico-US Air Force GHFS, Salinas, working Fendi 01 at 1852 and 1933. (Haverlah-TX)
- 15898.0 RFGW-French MFA, Paris, with encrypted FEC traffic, at 1530. (Watson-UK)
- 16840.5 RRR34-Moscow River Radio, with hourly FEC traffic list at 1300. (Privat-France)
- 17441.6 5YE-Nairobi Meteo, Kenya, with RTTY weather at 1546. (Watson-UK)
- 17451.7 Unknown Egyptian embassy calling SSBT (MFA, Cairo), in SITOR-A at 1507. (Watson-UK)
- 18261.0 GYA-UK Royal Navy Middle East/ Arabian Gulf service, with FAX weather charts at 1430. (Watson-UK)
- 18863.0 Cherry Ripe-British "numbers" (E4), Pacific area, with callup to 70807, simulcast 23461, at 1300. (Boender-Netherlands)
- 22356.5 LYOU-Unknown vessel calling UIW, Kaliningrad, Russia in 3rd-shift Cyrillic RTTY, at 1635. (Watson-UK)
- 22857.7 RFVI-French Forces, Le Port, ARQ control messages at 1544. (Watson-UK)
- 22928.6 S00-Swedish MFA, Stockholm, working S97, Swedish Embassy, Abidjan, Ivory Coast, in ALE-initiated PSK at 1241. (Watson-UK)
- 23190.0 RFGW-French MFA, Paris, with FEC traffic for N2G, encrypted and with "C" substitutions, at 0923. (Watson-UK)
- 23370.0 HZN50-Jeddah Meteo, Saudi Arabia, RTTY weather observations, at 0931. (Watson-UK)
- 23375.0 RCV-Russian Navy, CW messages to the Black Sea fleet, at 1445. (Privat-France)
- 23522.9 JMH6-Tokyo Meteo, Japan, weak FAX chart showing typhoon, at 0858. (Watson-UK)
- 27870.0 ADWSPR-US Air Force, Andrews AFB, MD, ALE sound at 1221. MCCSPR-McClellan AFB, CA, ALE sound at 1457. (Hall-RSA) [The "SPR" suffix is new. -Hugh]

Chirps Ahoy!

This month we take a look at some PC software that you can use to identify one of the most common, but probably most secretive HF signals – the ionosonde or chirpsounder. We also update you on the British Army's Reservist network, some Mexican Army activity and watch out for coast station telex lists.

Chirp Software

You may remember we discussed chirpsounders in our May 2001 issue of *Digital Digest*. In case you missed the issue, we let you into a little-known secret – set your receiver on a clear daytime frequency and simply listen. We can pretty much guarantee (unless propagation is *really* bad) that in twenty minutes of listening you will hear the tell-tale “fwip” (the chirp) of a chirpsounder passing by your receiver at least once.

To summarize, chirpsounders sweep a carrier rapidly (usually at a rate of 100 kHz per second) across a wide swathe of HF spectrum, typically from 2 to 30 MHz. Locked precisely to the sweeping carrier, a co-located receiver listens for an echo from the ionosphere above. The echo can be used to determine the state of the ether and hence, propagation.

Up until now, hunting down these instruments has been a specialized task, requiring some DSP software developed by the father of AMTOR and PSK31, Peter Martinez. Now, Andrew Senior, British radio amateur G0TJZ, has implemented Peter's software concept in a soundcard-based program for the PC called “Chirpview” (See Resources), the simple main screen of which is shown in Figure 1 below.

If you are lucky enough to own a GPS (Global Positioning System) receiver that can output its precise timing information to your computer via an RS-232 cable, Chirpview will be able to collect and then automatically identify the origin of the many chirps that will doubtless be audible in your location.

As if to illustrate our earlier point about the ubiquity of chirpsounders, we switched on the program whilst writing this column, 10 minutes ago at 1945EST local time. Chirpview's detec-

tion logfile already shows a number of hits:

Receive frequency now 14540.000 kHz

```
23:46:04 85418.9369 17.0
23:50:51 85706.4627 26.3
23:50:51 85706.5033 29.6
23:50:59 85714.5492 23.8
23:51:04 85718.7740 17.8
23:51:33 85747.6257 38.5
23:51:33 85747.6665 37.9
23:51:40 85755.5184 32.9
23:51:56 85771.5030 39.1
23:51:56 85771.5437 34.4
23:52:04 85779.5128 35.4
23:56:04 86018.6103 16.1
```

The detect log shows the clock time, time in seconds after 00:00:00UTC and the strength of the chirp. Other functions (for which the GPS timing source is required) allow one to pick a specific sounder and plot its characteristics over time which can generate a “do it yourself” ionogram or propagation chart at a fraction of the cost of a commercial sounder setup.

Even without a GPS receiver, Chirpview's detect log can be loaded into a spreadsheet program for analysis. Even though identification of specific sounders is unlikely to be achieved without a GPS timing source, analyzing the logfile still provided a lot of fun over a slow weekend here at (GPS-less) Digital Towers. We were at least able to recognize the network of sounders operated by the US Navy from three locations in the US and Puerto Rico all of which have a distinctive 720s period.

Without a doubt, Chirpview is our winner for this year's radio software of the year. And, like so many before him, Andrew has graciously made Chirpview free to us all.

British Territorial Army ALE Network

A number of monitors subscribing to the Internet's World Utility News have noticed a network that seems to be activated with each major military exercise that the British Army's reservist units, the Territorial Army, participate in. Here are the details:

Frequencies (kHz USB):

7512.5, 7935, 8064, 8160, 9148, 10586, 14745.5, 16115, 17460

Identifiers:

AAAC32, MSN1, MSN2, MSN3, MSN4, MSN5, OSN

Mexican Army Network

Various units of the Mexican Army, indicated by different sets of distinctive ALE identifiers, can be heard on a variety of frequencies. The ALE usually triggers scrambled voice using the Harris AVS (Advanced Voice System) equipment – now standard issue for a number of world's military and MOI (Ministries of the Interior) units.

Frequencies (USB):

5590, 7777, 9060, 10135, 10444, 14400, 14715 kHz

Identifiers:

“Planets” Network: 123, GALAXIA, UNIVERSO, VENUS

“Metals” Network: 123, JADE, BRONCE, ORO

“Earth” Network: ARBOL, COBRE, DELTA, MARMOL, MARTE, PLATA, ZORRO

Coast Station Telex Lists

As we're not great fans of the maritime short-wave scene here at Digital Towers, we occasionally find ourselves forgetting the few coast stations that transmit in the heart of the utility bands. Of those stations, here are the ones that make for some interesting listening:

OST Oostende Radio, Belgium

Transmits using standard SITOR-B according to the following schedule:

At H + 30 minutes on 5376.5 kHz

At H + 35 minutes on 7776.5 kHz

At H + 40 minutes on 14719.0 kHz

At H + 45 minutes on 19013.5 kHz

HEC Bern Radio, Switzerland

Transmits around the hour using standard SITOR-B on the following frequencies:

8071.7, 13991.7, 18231.7, 20091.7

In both cases, you'll see information about the stations with telexes awaiting collection.

Until next time, enjoy the digital DX.

Resources

Chirpview Software -

<http://www.asenior48.freemove.co.uk/chirpview.html>

G3PLX Chirps Page -

<http://www.qsl.net/z11bpu/chirp/chirps.html>

Monitoring Ionosondes -

<http://www.pacificsites.com/~brooke/MWI.shtml>

PA1RE Ionosonde Page -

<http://www.qsl.net/pa1are/chirps.html>

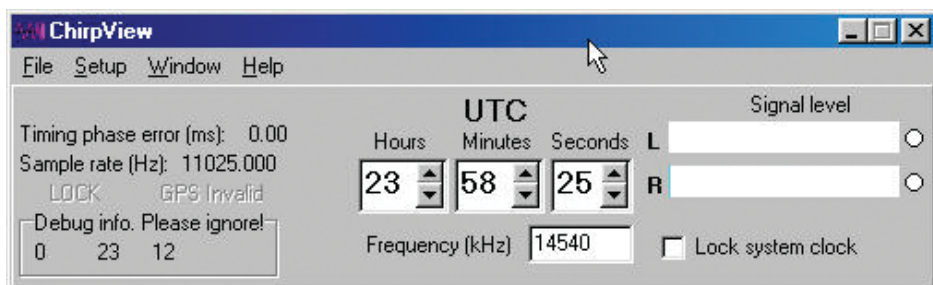


Figure 1: Chirpview screen

DRM Easily Jammed, But Could Be "Killer App"

Starting a thread in the BDXC-UK list was this question from Andy Cadier: With the impending Iraq problem does anyone know how robust Digital Radio Mondiale is against deliberate jamming?

Mike Barraclough replied: This question was dealt with by DRM spokesman Peter Senger on Radio Australia a few months back. In reply to a listener's question on the effects of strong interference on a DRM digital signal, he said that DRM had to have a bit error rate of below 10 to the minus 4; if this bit error rate was not achieved the receiver would mute. Any interference increases the bit error rate.

In response to a specific question as to whether it would be easier for foreign governments to jam DRM transmissions, since in analog the human ear is adept at picking out words from broadcasts subject to interference, he said that whoever would like to jam can jam; the bit error rate would go up and the receiver would mute, so contrary to analog, the effect of jamming would be no signal.

He said that standards had been established, and would be published by the ITU, so

that no adjacent channel interference would be caused. However, of course, on AM there is a different problem: at night the signals are subject to skywave and digital signals appear as a buzz on analog sets. That is why in the US IBOC AM is currently restricted to a daytime only service.

Having spent so much money promoting DAB is the British radio industry going to embrace DRM?

Chris McWhinnie added (with standard disclaimer): I wonder if it possible that the effects of DRM could be more profound long-term? Let's imagine DRM is readily available and cheap enough to start incorporating in many of the sort of products which contain an AM radio tuner, e.g. portable radio, personal radio, boom box, mini hi-fi. Blaupunkt intends to incorporate DRM in a car radio soon. Would some broadcasters not be beating a door to the short-wave transmission companies to pay to deliver a higher quality signal across a nation, across borders, maybe to a neighboring country? Would a station like Jazz FM, not a traditional international SW broadcaster, but a winner internation-

ally on the 'net, not want be heard on portable or car radios in as much of the world as was economic?

If new program content or reception convenience were to appear via DRM, would that not drive receiver sales? If a station, UK or foreign, wanted to reach all the UK from coast to coast with good reception using a single SW frequency, would that be viable? It's the chicken or the egg: receiver sales vs. brave broadcasters.

If DRM *does* start to appear in many radio sets, then it won't matter if a station is FM or DRM. If the programs are good and stay on the air without the poor listener having to understand how to retune and predict propagation, then we may have a killer app.

The regulatory implications are profound. Any local station could hire DRM transmission time from Merlin or go abroad and operate from there. Perhaps DRM will break the traditional model of domestic and external broadcaster on the SW bands, just as local radio stations rub shoulders with international giants on the Internet.

AFGHANISTAN Information Radio continues to be monitored in Kabul on 8700 kHz AM and 864 kHz. 6100, which European monitors continue to report despite a lack of a definite ID or parallel frequency, has not been heard. Programming has undergone tremendous changes since relaunching from Bagram AFB. Morning broadcasts until 0630 include popular Afghan music with announcements in Dari and Pashto about every twenty minutes and occasional PSAs. ID is currently (Dari) "In radyo-i mau'lumati" and (Pashto) "Da radyo mau'lumati."

Between 0630 and approximately 1930 it broadcasts only music and does not seem to ID; no announcements noted. Doesn't seem prerecorded; technical glitches often heard. Sometimes breaks for ten minutes or more. Music skips, indicating it uses both cassettes and CDs. Reception of 864 in Kabul is fair during day and becomes unstable after sunset, not heard after 1930. 8700 is received a bit better than 864 but its sign-off time seems earlier. Gauging the effectiveness of Information Radio among Afghans is difficult, but it is clear among people we have spoken to that the station is no longer paid much attention to in Kabul. It is possible and perhaps probable that its impact is greater in Kandahar and the Afghan countryside (Takuya Hirayama, *Clandestine Radio Watch*)

[non] On 18940, the Norwegian relay of R. Afghanistan back to the country, the feed is frequently lost and replaced by a dramatic 24-second music loop for hours at a time, noted both in late September and (again? still?) mid-October around 1430-1630. Beware, this tune can infest your brain if you keep listening. Pete Bentley transcribed the main melody notes as F-F-A-G-E-F-A-G-E-B (gh)

ALASKA FCC granted a construction permit Sept. 25 for the Aurora Communications International HF station at 11621 Sterling Highway, Ninilchik, AK, 60-06-34 N 151-34-21 W. No Call Letters listed in the notice IHF-C/P-20010521-00004 P (Donald Wilson, *DX Listening Digest*)

AUSTRALIA HCJB's HC100 transmitter was to be ready for shipping from Elkhart IN to Wyndham WA about the third week of September. God willing, it will arrive for installation in Kununurra by 26th November. On-air date is planned for 22nd December (HCJB News via ARDXC) And then the west coast dock strike intervened, possibly delaying the schedule (gh)

BULGARIA R. Bulgaria B-02 English, not all one hour now: WEu 0730-0800 12000 13600, 1230-1300 12000 15700, 1830-1900 and 2200-2300 5800 7500; NAm 0000-0100 and 0300-0400 7400 9400 (Observer)

CANARY ISLANDS The Korean language station

with Christian preaching on 6715-USB is still being heard, and finally pinpointed. It was previously traced to The Yoido Full Gospel church based in Korea; David Hodgson sent a tape of it to Korean DXer Sung Chul Cho, who after repeated listening was able to pull out a reference to Las Palmas! It turns out the Yoido website <http://www.soljiwon.com/archi/archi-b00.html> shows one of its churches there. In a Korean-only website, the pastor, Chung Byoung Sung, or Jung Byung Sung, mentioned USB broadcasts of services for fishermen in West African waters.

Dario Monferini, via Cumbre DX, provided the postal address: Plaza Agustin Castillo, 3, 35011 Las Palmas de Gran Canaria (Spain). Jari Savolainen, Finland, spurred the most recent investigation. An FG church member in Las Palmas confirms after listening to an audio file of 6715 that the program is theirs, says Cho. Savolainen got a QSL by E-mail to fglc@jet.es after sending his own audio file. Previous professional direction-finding from Europe instigated by Wolfgang Büschel put it at 224 degrees, i.e. the Canary Islands or further in that direction. Times monitored by Savolainen in October, here shifted one hour later after DST: Sun 1945-2020; Wed 2015-2130; Fri 2145-2330, but times vary up to 20 minutes. The church gave Cho the schedule as: Sun 1100 and 1900, Wed 2030, Fri 2130. Power is only 100 watts, with a reverse L type dipole on the church towards WAF (*DX Listening Digest*)

CHINA BBC is protesting to the Chinese Government over jamming of its SW broadcasts in Uzbek. Although there is no significant Uzbek population in China, the language is very close to that spoken by Islamic Uighurs, who make up more than half the population in China's western province of Xinjiang. This has prevented Uzbek speakers, most of them outside China, from hearing broadcasts in their own language.

Regular jamming since 1 September consists of a strong signal with the same music, gongs and string instruments, played over and over again (Malcolm Haslett, BBC's Eurasia analyst, BBC News via Sergei Sosiedkin) As usual, we were jammed first, discovered it first – ours and theirs – and are monitoring it daily via our network of Remote Monitoring Systems. It's been going on for months – against both VOA and BBC. Just about all Chinese jamming is 'Chinese opera' these days. I guess it helps with the 'denial' game – 'just innocent interference.' (Bill Whitacre, DC, IBB, Cumbre DX)

Usually two or three jammers can be heard on each jammed frequency, two stronger ones and a weaker one. The stronger ones usually have

*All times UTC; All frequencies kHz; * before hr = sign on, * after hr = sign off; // = parallel programming; + = continuing but not monitored; 2 x freq = 2nd harmonic; B-02=winter season; [non] = Broadcast to or for the listed country, but not necessarily originating there; u.o.s. = unless otherwise stated*

the same program, while the weaker one normally has a different program. Many jammers are somewhat off frequency, adding an annoying low frequency het to the echo caused by different signal delays. It seems that at least some jammers can switch between the program channels. I have noted 21540 switching from CNR to music just before 0700 and back to CNR just after 0900. The music jamming signal seems to start all over again on top of each hour (Olle Alm, Sweden, *DX Listening Digest*) see also TIBET

COLOMBIA La Voz de tu Conciencia, heard 0635-1120, on 6010.5v ex 6060.2; very interested in reception reports for evaluation of its signal and to support a request of frequency change to the Ministerio de Comunicaciones. Its address is: Librería Colombia para Cristo; Calle 44 No.13-69, Bogotá D.C. E-mail: rms05001@neutel.com.co (Rafael Rodríguez, Colombia) There are four other LA stations on 6010: Mexico, Chile, Uruguay, Brazil (DSWCI DX Window)

Station manager Russell Stendhal had been with Wickliffe Bible Translators, which decided to leave Colombia after two missionaries were killed. He now uses the former Wickliffe compound in Loma Linda, SE Colombia. Station is fully automated, voice tracks being recorded in Bogotá (Christer Brunstrom, HCJB DXPL via Marie Lamb, Cumbre DX) Strictly non-denominational but decidedly Christian, focusing on turmoil in Colombia and neighboring countries. All Colombian combatant forces do in fact listen to the broadcasts and appreciate them, so the station has remained untouched despite its location in the midst of an area of intense armed strife (the Colombian "llanos") where at least one of the parties involved in the conflict, the guerrilla, has imposed a ban on all existing evangelical churches (Henrik Klemetz, Sweden, *DX Listening Digest*)

CONGO DR Chief of Information to the UN Mission in the Democratic Republic of the Congo (MONUC), David Smith, told *Media Network* that Radio Okapi would fire up its three 10 kW Marconi shortwave transmitters in Kinshasa on 30 September, replacing temporary 100 Watt transmitters that had been in use for the past several months; on 6030, 9550, and 11690 (RN Media Network) R. Okapi heard the next day on 11690-USB plus carrier, weak and co-channel with a Somali radiotelephone circuit (also using USB). But heard a clear ID, and later on 6300, not 6030 (Chris Greenway, Kenya, *DX Listening Digest*)

CUBA RHC signals have deteriorated notably for some time here, no longer heard on 25m, nothing on 19m, and only weak on 9600. A pale image of what it was a few years ago (Horacio Nigro, Uruguay, *Conexión Digital*) Spending too much on electricity for jamming; and hurricane damage? (gh) Not one of my favorites, but I have noticed that RHC is distorted, emits spurs, frequencies maladjusted, as jamming has increased, not only against R. Martí, WRMI and others, but making adjacent channels inaudible (Rafael Rodríguez, Colombia, *ibid.*) It's getting worse and worse; at 1200, 9550, 15230 and 11760 are very distorted and weak (Héctor García B., México, *ibid.*) The blockade prevents them from getting replacement parts, and part of their equipment must be obsolete (Arnaldo Slaen, Argentina, *ibid.*) Only 6000 works lately and it sounds crappy. On the hurricane net I heard Arnie Coro talking about antenna damage; sounds like they also lack a decent recording/playback system (Bill Brady, *DX Listening Digest*)

CZECH REPUBLIC [non] Unauthorized R. Prague relay heard on 5696-USB, at 0220 in Spanish, running 10 seconds behind WRMI's relay of same on 7385 (Ron Trotto, IL, *DX Listening Digest*)

ECUADOR HCJB B-02 English to Eu: 0700-0900 5965; 2000-2200 11895; 0230-0400 12040, also to SAs (Ivo and Angel! Observer, Bulgaria) Direct broadcasts to India to be replaced at yearend by facility in Kununurra, Australia (Swapan Chakraborty, Kolkata, India, *DX Listening Digest*)

ERITREA/ETHIOPIA [non] "R. UNMEE broadcasting from Abu Dhabi... Voice of the United Nations Peace Keeping Mission in Ethiopia and Eritrea": Tuesdays 0430-0530 on 15215, mainly to Eritrea in Eritrean Tigrinya, Arabic, Tigre and English; Fridays 1900-2000 on 13735, mainly to Ethiopia, in Amharic, Afan Oromo, Tigrinya, Ethiopian Tigrinya, and English. English segments are 1945-2000, and 0515-0530 and the other language segments are translations of the English features. Mailing addresses are: ECA Building, PO Box 3001, Addis Ababa, Ethiopia; PO Box 5805, Asmara, Eritrea. Comprehensive background information, images, program transcripts and audio files are available at: <http://www.reliefweb.int> and <http://www.un.org/Depts/dpko/unmee/radio.htm> (Bob Padula, EDXP)

FRANCE I e-mailed the Conseil supérieur de l'audiovisuel (CSA) in France to ask them about any French services that might be testing on 25775. Response says that they have checked with colleagues at TDF and that the transmissions are digital and digital/analog operated by the CCETT at Rennes. They recommend checking out the DRM webpage for more info (Sheldon Harvey, DXLD) We are doing field trials for the DRM consortium. What you heard is an old test program (in order not to be considered as a real one) we use on a 200 W shortwave transmitter in Rennes, Brittany. These trials are made in a simulcast mode (analog + digital) of DRM protocol (Alain Delorme, TDF, via Jari Savolainen, *DX Listening Digest*)

GREECE [and non] ERT V. of Greece B-02, includes English to Europe 1530-1600 on 15725; 1930-2000 on 7475; Greek: to FE/Au/Pac 0600-0800 11900 via Delano; NAm 0000-0550 7475 5865; 1200-1500 9825 Delano; 1600-2200 17705 Delano; SAm 2000-2200 17565 Greenville (via Chris Rigas, IL) Never specified, but expect weekly English hours, if not preempted by ballgames, to remain Sat 1600, Sun 1800 (gh)

GREENLAND SW service of KNR is now official, as they are paying for it, on 3815-USB, 1500-1600 and 2100-2200, with news and announcements in Greenlandic and Danish; possibly extended around the Dec. 3 election. From Tasilaq on the east coast, running around 100-200 Watts (Stig Hartvig Nielsen, Denmark, *DX Listening Digest*)

HUNGARY B-02 Radio Budapest in English: Eu 2000-2028 UT 6025, 7135 kHz; 2200-2228 3975, 6025. NAm 0200-0228, 0330-0358 9835 (Observer, Bulgaria)

IRAN Tentative B-02 VOIRI in English: 0030-0127 UT 6065 6135 kHz; 1100-1227 15375 15815 15480 21470 21730; 1530-1627 7140 9605 11870; 1930-2027 702 6110 7215 11695 15140; 2130-2227 9820 11740 (Observer, Bulgaria)

ISRAEL Israel Radio B-02 English: 0500-0515 UT 9435 kHz [11605 but Dec 15-Feb 28 on 6280 instead]; AuAs, SAm 17600; 1115-1130 15640 17545; 1730-1745 11605 17545; 2000-2025 [11605 but Dec 15-Feb 28 on 6280 instead] 15640 13720; Africa 15640 (israelradio.org via Daniel Rosenzweig)

ITALY Rai International unveiled new web-site geared to overseas audience. Now every language service has its own page with brief history of station, schedule. On-line broadcasts: <http://www.international.rai.it/radio/hotbird/index.shtml> Plans for a "DX-corner" to confirm reports in real time by downloading electronic QSLs (Ivan Melkynyan, Rome via DX-Libero, via Moscow DX-Bulletin via Sergei Sosiedkin) Reckon any humans check the reports before 'confirming'? (gh)

[non?] B02 IRRS-Shortwave to Europe: 0630-0730 UT M-F, 0900-1400 Sat & Sun on 13840 kHz, 10 kW (equivalent to 25 kW), in A3A or A3 modulation. Reports to reports@nexus.org, or IRRS-Shortwave, PO Box 10980, I-20110 Milan, Italy. We encourage listeners to send comments related to content in the current programming (Ron Norton, NEXUS-IBA, via Cumbre DX) Although we may not currently disclose any additional information in this regard, we are working to transfer and expand our transmitting facilities outside of Italy, and tests have already begun from multiple locations without making a lot of "noise." In the next few months our offer will include transmitting powers up to 500 kW, and we will be able to cover much better such areas where SW reception is still quite popular, such as Eastern Europe, the Middle East, Asia and the Pacific (Alfredo E. Cotroneo, CEO, NEXUS-Int'l Broadcasting Association, *DX Listening Digest*)

JAPAN [and non]. Radio Japan B-02 English to Americas: 0000-0100 UT 6145-CAN; 0100-0200 UT 17835 kHz; 0300-0400 17825; 0500-0600 6110-CAN; 0500-0700 9835; 0600-0700 17870; 1100-1200 6120-CAN; 1400-1500 9505; 1700-1800 9505; 2100-2200 17825 21670; (NHK World, R. Japan via Andreas Volk, ADDX, via Wolfgang Bueschel)

KAZAKHSTAN [non] Radio Dat seems to have been broadcast from Lithuania all from the beginning. Had to replace 9775 because of strong co-channel interference from CNR-2 beaming to the adjacent Xinjiang/Tibet zone from the east - poor choice of frequency (Olle Alm, Sweden, *DX Listening Digest*)

KOREA SOUTH B-02 schedule for RKI shows several new channels, with up to six 250 kW transmitters listed for simultaneous use from the Kimjae site, upgrading of capacity there, and a new service directed to Australia and New Zealand is scheduled on 15225, at 0500-1100. Other new channels listed include:

11945 0600-0900 to NAm

15265 0600-0800 to SAm

15335 1000-1300 to SAm

17750 2300-0100 to NAm

17780 2100-0000 to NAm

17870 2200-0000 to Hawaii (Bob Padula, EDXP)

LAOS [non] 17540, United Lao Movement for Democracy *0059-0110 0059 bell, 0100 with IS and ID, opening in Lao? (Kouji and Kenji Hashimoto, *Japan Premium*) ULMD, 17540 is a Merlin operation via Moscow control, Tashkent transmitter, to Laos. Most likely change to 12070 in B-02 season, 0100-0200, 200 kW, 131 degrees (BC-DX) UT Fri only; in Hmong; address P O Box 2426, St. Paul, MN 55106 (CRW)

LIBERIA The High Adventure SW transmitter stored in Nigeria was being shipped to Monrovia for our new SW station (Doc Burkhart, WJIE)

MARSHALL ISLANDS Among WJIE's numerous projects is setting up a SW station here (Doc Burkhart, WJIE This Week)

MONGOLIA Voice of Mongolia B-02 English, daily, with kW, azimuth: 1000-1030 UT 12085kHz 250W 178az; 1500-1530 12015 50315; 2000-2030 12015 50315; (via Nicolás Eramo, Argentina)

MYANMAR 5040.58 could be Myanmar, ex 4725, 1301 past 1354, long talks in languages, same buzzy transmitter sound that one heard on 4725, only there is nothing there (Hans Johnson, WY, Cumbre DX) Also heard on 5040.6 1515 with lessons in SE Asian language, phrases in English, exactly like what I used to hear on 4725, where nothing is heard now. Audio on 5040.6 went off at 1537 and carrier off at 1541 (Jari Savolainen, Finland, *World of Radio*)

NEW ZEALAND RNZI until 30 March, subject to change:

1650-1750 11980 NE Pacific, Fiji, Samoa, Cook Islands Sun-Thu

1751-2050 15265 All Pacific, also heard in Europe

2051-0505 17675 All Pacific, westcoast of the USA

0506-0705 15340 All Pacific, also Europe, and mid-west USA

0706-1105 11675 All Pacific, also mid-west USA

1106-1305 15175 NW Pacific, Bougainville, East Timor, Asia

1306-1650 6095 All Pacific - Usual Closedown is 1305

6095 is for occasional overnight broadcasts to the Pacific for sports commentaries or cyclone warnings. Bougainville/Timor Transmission 1105-1305 UT is directed to the North Western Pacific and Asia for NZ Forces serving overseas (RNZI Website via Alokesha Gupta)

OMAN BBC's relay on Mashirah Island closed down Oct. 7, final broadcast until 2159:30* UT on 6030. Phase-in of new mainland site A/Seela took two months (Vlad Titarev, Ukraine, BC-DX) Some of the planned B-02 usage happens to be more or less toward North America, such as 9825, 2000-2130 250 kW, 335 degrees (via BC-DX)

PAKISTAN New registrations on the 15m band for B-02: R. Pakistan, 0500-0700 and 0800-1100 on 18920; 0600-0700 and 0800-1100 on 18970 (Bob Padula, EDXP)

PARAGUAY R. America kept changing test frequencies, but at prestime was on 2300, 7737 and 9983, with most DX reports concerning the 7 MHz frequency. For an illustrated article by Dom Mur about R. America see http://www.dxing.info/profiles/paraguay_america.dx (DXLD)

PERU 3172.77, Radio Municipal, 1010 flauta andina, ID, Spanish covers of pop music till 1040 fade out, second ID 1028 (Robert Wilkner, FL, *DX Listening Digest*)

The Nueva Cajamarca station on 6323.9 previously thought to be La Voz del Vecino is actually Radio Comercial, La Voz del Destino, heard until 2302* and from *1035 (Rafael Rodríguez, Bogotá, Colombia, *Conexión Digital*)

New station from Huancabamba, Piura is R. Tropical, 6419.2, better in LSB, at 2311-0158*. Not a harmonic, since announced as 6420. May be same transmitter heard in 1995 on 6420.2 from this city as R. Imperial, in the interim owned by R. Mi Frontera, Chirinos (Rafael Rodriguez, Colombia, dxing.info)

RUSSIA Pres. Putin revoked a 1991 decree of Pres. Yeltsin giving special status to R. Liberty. This led to a lot of spin, about whether it really had special status compared to other stations, and resolve to continue its independent editorial policy (from numerous press reports)

SOUTH AFRICA B-02 transmissions from Meyerton include:

Channel Africa in English:

0300-0330 9525; 0400-0430 5955; 0500-0530 11710; 0600-0630 15215;
1300-1455 21760 17725; 1710 Sat & Sun only; 1500-1530 17725; 1600-1630 9525; 1700-1730 17870; 1800-1830 17870

Radio Veritas Productions, English

1000-1100 7240; 1600-1900 3230 followed by:

Family Radio, English

1900-2100 3230

Radio Sonder Grense, Afrikaans

0500-0700 7185; 0700-1700 9650; 1700-0500 3320

South African Radio League, English

0800-0900 9750 21560 Sat; 1800-1900 3215 Sun

Radio Ecclesia, Portuguese

1900-2000 7205

(via Milligro Nkosi, Transmission Planning, Sentech (Pty) Ltd, *DX Listening Digest*)

SRI LANKA SLBC to Asia changed frequencies to avoid interference: 7440 (ex 7190) 0025-0400, 0800-1600 Indian languages; 15745 (ex 15425) 0025-0430, 1225-1530 English (Jose Jacob and Victor Goonetilleke, *DXLD*) Despite WEWN 24 hours, 500 kW on 15745! Totally blocking it here; one must move (gh, OK) Heavy clash on 15745 in Europe (Stig Harvig Nielsen, Denmark; Mike Barracough, UK; Jouko Huuskonen, Finland) The All Asia Service and "Early Bird Show" will be useless here as long as they stay on 15745 under WEWN (John Cobb, GA, *DX Listening Digest*) Too bad for DXers, but both 7440 and 15745 are interference free here in India, while ex-7190 and 15425 had terrible QRM (Jose Jacob, *DXLD*) For B-02, WEWN on 15745 no longer 24 hours, just 1000-1600, 1800-2200, not much better (Noel R. Green, UK, *BC-DX*)

SWEDEN R. Sweden B-02 English to NAM: 0230-0300 and 0330-0400 on 9495 via Sackville, Canada; 1230-1300, 1330-1400 and 1430-1500 18960 direct (George Wood, *SCDX/MediaScan*) 18960 heard on 2nd harmonic, 37920 at 1330 (Ron Trotto, IL, *DXLD*)

SYRIA [non] On Oct 1, V. of Homeland shifted two of its broadcasts one hour later, evidently due to DST change in originating or target country: 1600-1630 on 12115, while 12085 stayed at 1500-1530 (via Observer, Bulgaria) and 9950 at 0330 moved to 0430-0500. Winter time in Syria started Oct 1 (Stavros M., Limassol, Cyprus, *DX Listening Digest*) Same station as 12085 heard at 1515 on 24170 = 2x (Wolfgang Schweikert, Germany, *BC-DX*)

TAIWAN RTI website says B-02 English to Europe 2200-2300 [via WYFR] changed to 9355, rest same (via Daniel Say, BC, *DXLD*)

TANZANIA Since 23 September I'm hearing Radio Tanzania on reactivated 7280 in daytime, back after many months. Parallel 5050 continues (Chris Greenway, Kenya, *DX Listening Digest*)

THAILAND Verie signer and address for BBCWS relay is: Miss Puangtip O, BBC Asia Relay Station, P O Box 20, Muang, Nakhon Sawan 6000, Thailand (Chris Stacey, East Sussex, *BDXC-UK Communication*)

R. Thailand, B-02 English:

0000-0030	Europe-Africa	9680
0030-0100	US-East	13695
0300-0330	US-West	15460
0530-0600	Europe	13780
1230-1300	Asia-Pacific	9810
1400-1430	Asia-Pacific	9530
1900-2000	Europe	9535
2030-2045	Europe	9535

(via Alokesh Gupta, India)

TIBET I believe all sites for Xizang PBS 1 and 2 are located within Tibet, at Lhasa, but there may be two separate sites as 4905 and 7385 often have a satellite delay compared to the other transmitters of the Tibetan channel. Programming heard in the background of 7385/4905 is synchro with audio of the Chinese channel, so 7385/4905 and the five transmitters of the Chinese channel seem to form one group, while the other six transmitters of the Tibetan channel form a second group. The now defunct site using 4750, 5950 and 11950 is likely to have been scrapped. These transmitters were lowpowered and more or less off channel, so may have remained from the early days of broadcasting in Tibet.

It has been suggested that the new highpowered Tibetan transmitters would actually be located in Xi'an, but this can safely be ruled out due to the many low frequencies used. When Xizang PBS relays CNR-1 the delay is 6 to 8 seconds compared to other transmitters. Some of the current transmitters are probably directional to east and west Tibet. 15285 has also been reported for Tibet, but I have been unable to confirm this one (Olle Alm, Sweden, *DX Listening Digest*)

Evidently HFCC listings changed site from one year to next: in 2001, 9490 was shown as Xi'an beaming 255 degrees; in 2002, 9490 is Lhasa, 85 degrees; both 100 kW (BC-DX) Tibet's 7385 frequency is blocked in B-02 by VOA Sri Lanka, scheduled 1200-1700 and 1800-2400, with the hour in between a BBC relay via Moscow (Wolfgang Buschel, *BC-DX*)

China Tibet People's Broadcast Co., 9490, returned full data prepared card signed by Miss Tse Ring Yuzen, President of Tibet Radio, and stamped with the station seal. Actually took the trouble of modifying my prepared card by pasting their Tibet Radio logo over one of my clipart graphics. It will be interesting to see

if they now adopt this version of my card as their own design. Received in 5 weeks for my English language report on their "Holy Tibet" program. Also included was a letter from the show's hostess, Tse Ring Dely, about her background and interests, program schedules, and a postcard (George Maroti, NY, *Cumbre DX*)

TINIAN Concerning the delay between RFA broadcasts, all are from the same source. We intentionally insert delay at the site between separate (frequency) broadcasts of the same program. At times, we have six 500 kW and two 250 kW transmitters on air; have to be careful of power surges on local power grid. Imagine what would happen (and has in the past) if all eight transmitters lost modulation (the music stops, the announcer is quiet) at the same time. We get programming to broadcast to Communist China via a Chinese satellite. Go figure! Includes RFA (80%), VOA (19%), Radio Australia (1%) for a total of 135 broadcast hours per day. This does not include the 37 Bh/rs/day from Saipan. There is a photo of the Tinian site on my webpage at the end of the WWII section <http://www.tourtinian.homestead.com/WWII.html> (Larry Brewster, Boeing Service Co., Robert E. Kamosa Transmitting Station, *DX Listening Digest*)

TURKEY VOT B-02 English: 1330-1430UT 17690kHz Au/As, 17815 Eu; 1930-2030 9890 Eu; 2130-2230 9525 Au/As; 2300-0000 9655, 6020 NAM/Eu; 0400-0500 6020 NAM/Eu (via Bob Padula, *EDXP*) Actually 50 to 55 minutes long. Try the 17 MHz frequencies in C/ENAM (gh)

USA The 16-page VOA program guide is hard to find on website, so shortcut to VOA Guide is <http://www.voa.gov/voaguide.pdf> (Kim Elliott, DC, *DX Listening Digest*)

On the road back from the Watonga Cheese Festival, the scan stopped on 17895, VOA to Africa, Sat at 2045. *Nightline Africa* seemed a bit strange. Interspersed with (train?) sound effects, announcer was greeting listener after listener by name in Liberia, and assigning them consecutive 'seat' numbers, around 5370. Then the same for Nigeria, along with brief greetings or homilies to each. Our tax dollars at work gaining friends for the US in Africa. Who needs QSLs or SWL callsigns if you can get a seat number? Or is that *Night Train Africa*? (gh)

Two ex-VOA staffers, Nick Olguin and Jack Quinn, sent an open letter to Sen. Kay Bailey Hutchison (R., TX), other officials and the press, criticizing VOA for being so un-American as to purchase most of its new transmitters from European manufacturers, such as Thales in France, rather than American firms, such as Continental, in Dallas.

However, Continental has sold shortwave transmitters to China [q.v.], which has stepped up jamming, with the Continentals and/or freeing up old clunker transmitters for this (gh)

R. Sawa has been offering a screensaver, with logo bouncing around, for Windows to DXers, even outside its target area, who have E-mailed comments to radiosawa.com (via Swapan Chakraborty, India, *DX Listening Digest*; Sean Gilbert, UK, *EDXP*)

FCC public notice shows grant of a new HF station to Grace Missionary Baptist Church, apparently at the same location as WTJC, effective August 16, IHF-C/P-20020510-00002 P NEW (Benn Kobb and Donald Wilson, *DX Listening Digest*) On 5919.93, WBOH at 0226 Sept 30 with contemporary gospel music / WTJC 9370. FBN web site at <http://home.ec.rr.com/fbn/> says they're setting up WBOH 5920 kHz. (Ralph Brandi, NJ, *Cumbre DX*) FBN is in the midst of setting up the second shortwave station in Newport, NC, to reach Central and South America with the Gospel of Jesus Christ in English, Spanish, and Brazilian Languages. WBOH Worldwide Beach of Hope pix at <http://home.ec.rr.com/fbn/Projects.htm> (*DXLD*) Initially tests were only 15-20 watts of power. When Brandi heard them, power had been raised to 30-40 watts. Were awaiting main transmitter to arrive from Canada. WBOH site in Newport is some 4-5 miles away from the transmitter of WTJC, FBN's first SW station (*DXing.info*)

FCC website shows new station planned for B-02, KIMF in New Mexico on 5835 at 0000-1800, 11885 at 1800-2400, both 50 kW, 135 degrees. Permittee: International Fellowship of Churches, Inc/dba IMF world missions. File Number: IHFCP-20011210. Transmitter Location: Intersection Spring Mesa Rd & State Rd 506, 1 sesquimile SW of Piñon, NM. Coordinates: 32 36 33 N Latitude. 105 24 51 W Longitude. Address: International Fellowship of Churches, Radio Station KIMF, 9746 6th Street, Rancho Cucamonga, CA 91730, USA. Two Modified GE BT-50-G 50.0 kW, 0.0015% emission tolerance. Rhombic antennas with 14 dB gain for 23, 35, 100 and 135 degrees (Bill Matthews, OH, *BC-DX*) Contact for KIMF is given as Dr. James Planck, whose website <http://plancktech.com/> does not mention KIMF but claims: "One of our specialties is the retuning of older transmitters to new frequencies and the conversion of older AM transmitters for use on the HF bands. We also manufacture a line of low cost HF broadcast transmitters up to 50 kW." (Dr. Hansjoerg Biener, Germany, *BC-DX*)

Testing on 5050, WWRB, music of the '70s and '80s at 0145 (Adán González, Catia La Mar, Venezuela, *DX Listening Digest*)

WBCQ website changed from <http://wbcq.net> to <http://www.wbcq.us> - this one has a 7415 streaming link as picked up on SW in Pittsburgh by Complex Variables Studio (gh)

Harold Camping, the non-ordained preacher and head of Family Radio for 43 years, wants Christians to stop going to church. The church age is over, the end times are imminent, and churches are not merely irrelevant but "altogether apostate" because they soft-pedal the gospel, says Camping, 81, since about June of last year. God has turned instead to... radio. Camping's unorthodox stance has riled many church leaders, and his heavy-handed editing of their programs has prompted several preachers to quit Family Radio, among them the *Bible Study Hour* and *Back to the Bible*. Numerous Web sites have sprung up denouncing Camping for "heresy" and "apostasy," and several pastors have written to complain that his views have compelled some of his listeners to quit their churches. "After 13,000 years of history... God allowed mankind to discover electromagnetic waves." (David O'Reilly, *Philadelphian Inquirer* via Joe Hanlon)

...Until the Next, Best of DX and 73 de Glenn!

0056 UTC on 9925

GERMANY: Croatian Radio relay. English/Croatian service. Announcer's text to choir anthem at 0100. English ID "Voice of Croatia" to 0106 newscast. **Swiss Radio's** German relay station 15220, 1735 // 17735. (Tom Banks, Dallas, TX) ; 15580, 1945-1955+ (Harold Frodge, Midland, MI) **Radio Liberty** via Lampertheim, Germany 11725, 0345. (Frank Hillton, Charleston, SC)

0058 UTC on 6925

PIRATE (USA): Lounge Lizard Radio. Hard rock music to Mel Torme and the Meltones vocals. Volare interval signal to 0106*. QSL maildrop Providence, RI. (SIO 344); **Radio Azteca** 2311-2325*. **United Patriot Militia Bingo** 0110-0125, 6952.6 AM; **Pan Global Wireless** 0127-0138, 6950 USB; *0230, 6052 USB **Sycko Radio**; **Jean Chretien Worldwide** *2348-2416, 6925 AM; **Hippy Radio** 0214-0231, 6955 USB. Euro Pirate-**Radio Alfa-Lima** (tent.) 2300-2307, 15069.6 AM. (Frodge, MI)

0125 UTC on 5930

SLOVAKIA: Radio Slovakia Intl. News on proposed industrial park and national tax rates lower than Czech Republic. (Harold Moser, Lincolnshire, IL)

0142 UTC on 5675

CHILE: Voz Cristiana. Spanish talk program to ID and station jingle. SIO 122. Audible 21500 at 1148. (Rik van Riel, Curitiba, Brazil/HCDX)

0205 UTC on 5010.90

HONDURAS: Radio Misiones Internacional. Spanish Announcement, "escutando la palabra de Dios" to identification. Fair signal of low quality. SIO 222. (Daniele Canonica, Muggio, Switzerland) **Radio Litoral** 4832, 1140 with Christian pop vocals. (Sam Wright, Biloxi, MS)

0410 UTC on 9435

ISRAEL: Kol Israel. French news service // 16640, 17600. (Mackenzie, CA) 1915, 17545, // 11605. (Bob Fraser, Cohasset, MA)

0420 UTC on 17580

AUSTRALIA: Radio. Interview focus on child care in Australia, // via Shepparton, 15515, 15415, 15240. (Mackenzie, CA) Monitored 1230, 9580. (Fraser, MA) Tentative on 11650 // 9580 (barely audible) 1639-1645+. (Frodge, MI)

0440 UTC on 15320

MADAGASCAR: Voice of Hope relay. Discussion on hospital emergency room services available in Africa. **Radio Netherlands** Madagascar audible at 1615, 9890 // 11835 with interviews to 1625*. (Mackenzie, CA) 1930 UTC on 11655. (Fraser, MA) 21480, 1145 & 17580, 1410. (van Riel, Brazil, HCDX)

0836 UTC on 3905

INDONESIA: RRI-Merauke. (Irian Jaya) Powerful signal but not in the clear from PNG's New Ireland station. **RRI-Gorontalo** (Sumatra) 3266.47, 1030 with station ID. Pipe music and *Call to Prayers* at 1058. (David Norrie, Auckland, NZ/HCDX) **RRI-Jambi** (Sumatra) 4925, 1140 with regional announcements; **RRI-Makassar** (Celebes) 4753.45, 1220 national news segment to interview. (Van Horn, NC) **Voice of Indonesia** (Java) 15149.85, 2004-2016+ with world and national news to identification. (Frodge, MI)

1008 UTC on 3220

ECUADOR: HCJB. Religious service to Andean flute music. (Gayle Van Horn, Brasstown, NC) 2100, 21455 (Fraser, MA). 0100, 9745 (Frodge, MI) Ecuador's **LV del Napo** audible 1005 on 3279.58; **Radio Quito** 1020, 4919. (Van Horn, NC) Tentative on **Radio Oriental** 4781.35 at 0014. SIO 322. (van Riel, Brazil, HCDX)

1025 UTC on 4876

BOLIVIA: La Cruz del Sur. Regional Spanish news to ad jingles and La Paz soccer scores. Very nice Andean vocals. Radio Mosoj Chaski 0007, 3310; (van Riel, Brazil/HCDX)

1035 UTC on 3324.9

GUATEMALA: Radio Maya de Barillas. Program pause for identification. Spanish service for vocals and announcer's text. Fair signal quality. Guatemalan **Radio Cultural** audible 1145 on 4780. (Van Horn, NC)

1130 UTC on 25820

FRANCE: Radio France Intl. French. National newscast to station ID and music jingle. Magazine program format. RFI heard on 21685 at 1440. (Duane Hadley, Bristol, TN)

1216 UTC on 4760

ANDAMAN ISLANDS: All India Radio. Hindu service from lady announcer, followed by Asian and subcontinental vocal music. (Wiseblood, TX/Cumbre DX) India: 0245, 11620 on Indian film industry. (Fraser, MA) 1746, 17670 // 11620; 0040, 13605 // 9950; 1815, 13605; 2208, 11715. (Mackenzie, CA) 1115, 13645 // 15409.97 (Ziolkowski, WI/CDX)

1350 UTC on 18960

SWEDEN: Radio. Proposal for electric generating windmills to be built in the Baltic Sea. (Fraser, MA)

1735 UTC on 17570

ASCENSION ISLANDS: United Nations relay. News and commentary on Bin Laden resolutions // 17710. (SIO 222) (Mackenzie, CA)

1740 UTC on 17720

PHILIPPINES: Radio Pilipinas. Program interviews to Passport to Malaysia feature. Station ID 1743 // 15190; 1915, 17720 include ID as, "Voice of the Philippines" to 1930*. // 15190. (Mackenzie, CA)

1750 UTC on 11970

JAPAN: NHK/Radio Japan. Pop music, news and commentary to 44 Minutes program. ID/freq quote. French service commencing at 1800; 17825, 0330 // 21610. (Mackenzie, CA)

1900 UTC on 11675

RUSSIA: Voice of. Feature on Russian holidays. Audible 1925, 15735 // 9775 (poor). (Fraser, MA) 0150, 9665. (Moser, IL); 0215-0225, 7180. (David Weronka, Benson, NC) 0349, 17690 // 17660 (Vladivostok); 17650 (Petropavlsk); 12000 (Petropavlsk); 11750 (Moldova); 17795 (Khabarovsk). (Mackenzie, CA) 1645-1700*, 11720. (Frodge, MI)

2016 UTC on 15475

ANTARTICA: Radio Nacional Arcangel (Argentina) (tent.) Continuous Spanish vocal music audible. No announcer heard amid poor with occasional signal peaks. (Frodge, MI)

2038 UTC on 11905

UZBEKISTAN: Radio Tashkent. English poetic readings, commentary and instrumentals. SIO 332 with interferences noted, // 9545 covered, *2130-2138+ "Radio Tashkent Calling" after brief interval signal into newscast. (Frodge, MI)

2200 UTC on 7230

YUGOSLAVIA: Radio. Station interval signal from 2157 to "this is Radio Yugoslavia." Newscast to 2206, commentary and classical music. Poor copy, although improved considerably. Station ID 2222 with schedule, monitored in LSB to avoid interference. Noted *0000-0027* on 9580; *2330-2357* on 7230. (Frodge, MI)

2230 UTC on 11600

CZECH REPUBLIC: Radio Prague. News item on coalition government formed // 15545. (Fraser, MA) Spurious signal observed 0215, on 5696 USB, recognized at interval signal melody at 0228. SIO 442. (Riel, Brazil/HCDX) 2212, 11600 // 15545 (SIO 4440 (Mackenzie, CA)

2302 UTC on 4886

PERU: Radio Virgen del Carmen (tentative). Spanish. Andean tropical music to brief announcement. SINPO 24432. Peruvians monitored as; **Radio Huanta** 2000 4746.92, 2327-2332; **Radio Ilucan** 5678, 2323-0000; **Radio La Hora** 4855, 2335-2340; **Radio Cultural** 4955, 2344-2348; **Radio Difusora** 6535, 2349-2355; **La Voz de las Huaringas** 6816.78, 2351-2358. (Arnaldo Slaen, Buenos Aires, Argentina)

2307 UTC on 11700

BULGARIA: Radio. World news to Events & Developments segment. (Frodge, MI) 2155 on 11900; 2350, 11700 // 9400. (Fraser, MA) 0239, 9400 // 11700. (Mackenzie, CA)

2310 on 9570

ROMANIA: Radio Bucharest. News on annual report of the National Bank of Romania. (Fraser, MA) 0415 on 11940. (Moser, IL)

2339 UTC on 5100

LIBERIA: Liberian Communications Network. African news to 2342 then schedule. Rap and reggae tunes to "LCN" identification and brief closing announcement. Excessive RTTY interference in AM, (SIO 333). (Frodge, MI)

*Thanks to our contributors – Have you sent in YOUR logs?
Send to Gayle Van Horn, c/o Monitoring Times (or e-mail
gayle@webworkz.com) Please note: paper strips and cassette
recordings will no longer be accepted.
English broadcast unless otherwise noted.*

QSLing – Your Way

Without doubt, most QSL collectors have spent a considerable amount of time and money on what seems a never ending quest. Most of us would rather not know how much we've spent sending reception reports.

If your time or funds are limited you can still enjoy QSLing by taking a narrower view. Perhaps you could place power limitation on the stations you report to – for instance, QSLing those using twenty kilowatts or less: On the other hand you could DX only the major international powerhouses. Why not seek out your favorite programs, or collect special commemorative cards to mark

important occasions or special events in the history of the county or station?

Consider, too, a focus on just one country or a particular area of the world that especially interests you. There are any number of categories to focus on, including religious broadcasters, tropical stations, clandestines, utilities, AM/FM and the bizarre world of pirates. Lastly, take a tip from the amateur radio operators and DX only those stations found in a particular meter band.

You can still stay in the QSL game with a new approach, and have it your way. *Happy Holidays from QSL Report!*

AMATEUR RADIO

Italy-I12R, 10 meters SSB. Full data color Saronno DX Team card. Received in eight days via ARRL bureau. (Larry Van Horn-N5FPW, NC)

Italy-IK2XYG//IL7, 20 meters SSB. (IOTA EU-050-San Nicolas Island). Full data color card in 13 months via ARRL bureau. (Van Horn, NC)

Italy-IN3NJB, 20 meters SSB. Full data black/white card. Received in ten months via ARRL bureau. (Van Horn, NC)

Italy-I2ZDPX, 10 meters SSB. Full data black/white card. Received in eight months via ARRL bureau. (Van Horn, NC)

Japan-JS3CTQ, 10 meters SSB. Two full data color cards. Received in ten months via ARRL bureau. (Van Horn, NC)

ARMENIA

Voice of Armenia, 9965 kHz. Full data unsigned station card, plus three station stickers. Received in 63 days for an English report and one US dollar. Station address: Radio Agency, Alek Manoukian Street 5, 375025 Yerevan, Armenia. (Duane Hadley, Bristol, TN)

BULGARIA

Radio Bulgaria, 9400 kHz. Full data unsigned QSL scenery card plus program schedule. Received in 91 days for an English report and two US dollars. Station address: English Service, P.O. Box 900, BG 1000 Sofia, Bulgaria. (Joe Squashic, Wake Forest, NC)



CANADA

Radio Telefis Eireann (RTE) relay, 13730 kHz. Verification letter for special sports broadcast signed by Gerry Kelly-Production Manager, plus station stickers and broadcast schedule. Received in 14 days for a taped report and one IRC (returned). Station ad-

dress: Radio Centre, Dublin 4, Ireland. (Ben Loveless, Bloomfield Hills, MI)

CHILE

Radio Esperanza, 6090 kHz. Full data card unsigned, plus program schedule, Spanish religious literature and schedule. Received in 75 days for a Spanish report (they also accept English), two US dollars and a souvenir postcard. (Thomas J. Banks, Dallas, TX)

CLANDESTINE

Echo of Hope, 6348 kHz via Korean Broadcasting System (KBS). Full data card from KBS, plus station magazines. Received in 77 days for an English report. Station address: # 18, Yoido-dong, Youngdungpo-gu, Seoul 150-790 South Korea. (Arnaldo Slaen, Buenos Aires, Argentina)

ECUADOR

HCJB, 9745 kHz. Full data Ecuador's Scenic Coast series card signed by John E. Beck-Station Manager, plus letter from Jeffrey Ingram-English Service Director. Program guide, religious brochure and reception log enclosed. Received in 25 days for an English report. Station address: Casilla 17-17-691, Quito, Ecuador. (Stephen Zolvinski, Columbus, OH)



Radio Centro, 3289.90 kHz. Full data letter signed by Luis A. Gamboa Tello-General Manager, plus Bonita FM 93.7 station stickers. Received in 26 days for a Spanish report. Station address: Casilla 18-01-574, Ambato, Ecuador. (Slaen, ARG)

MEDIUM WAVE

KATZ, 1600 kHz AM. Full data verification on station letterhead signed by James C. Hall-Engineering. Received in seven days for an AM report and one US dollar (returned). Station address: 1910 Pine St., Ste. 225, St. Louis, MO 63103. (William Wilkins, Springfield, MO)

KFXR, 1190 kHz AM. Fantastic package re-

ceived via Fed Ex overnight including, full data folder QSL card signed by Eric Landrum-Events Coordinator, plus Fox Sports 1190 T-shirt, stickers and an assortment of station souvenirs. My second station T-shirt received in a week! Station address: 15851 Dallas Parkway # 1200, Addison, TX 75001. MW # 2,821. (Patrick Martin, Seaside, OR)

KNRO, 1670 kHz AM. Full data ESPN-KNRO QSL card signed by Jim Bremer-Chief Engineer. Received in 12 days for an AM report. Station address: 3360 Alta Mesa Drive, Redding, CA 96002. (Martin, OR)

KOOQ, 1410 kHz AM. Full data letter signed by Chuck Schwartz-General Manager. Received in seven days for an AM report. Station address: 1301 East Fourth, North Platte, NE 69103. (Patrick Griffith, Westminster, CO)

WDAY, 970 kHz AM. No data letter signed by Lori Becker. Received in 11 days for an AM report. Station address: P.O. Box 2466, Fargo, ND 58108. (Griffith, CO)

WTTM, 1680 kHz AM. Princeton, NJ. Nice package with QSL Certificate signed by Neal Newman-KA2CAF-Chief Engineer, plus two EBC radio posters, business card and mint sample of QSL card issued by previous station owners. Received in 110 days for an AM report. Station address: 456 Middlesex Ave., Metuchen, NJ 08840. (Griffith, CO)

PIRATE

Voice a' Da Tiki, 6925 kHz. Full data color picture of island dancer in a Pacific beach scene paying homage to Tiki. Received in 160 days for a pirate report, one US dollar and an address label (used for reply). Pirate maildrop: Box 69, Elkhorn, NE 68022. (Wilkins, MO)

RUSSIA

Voice of Russia, 9665 kHz. Full data QSL card from the old Soviet Union series, plus nice personal thank-you letter from Elena Osipov-Letters Dept., including a photo of The People's Friendship Fountain. Station address: 113326, Pyatnitskaya Str. 25, Moscow, Russia. (Zolvinski, OH)

UTILITY

USA-US Army, 13512.5 kHz USB. Full data Armed Forces Day card signed by SSgt. Owens-Station Chief. Received in 101 days for a utility report, SASE, prepared card (both used for reply) and a picture postcard. Station address: 1110th Signal Bn, Attention: MARS Station, Bldg. 1678, 1671 Nelson St., Ft. Derrick, MD 21702. (Wilkins, MO)

Listening At Leisure

The winter months are just about upon us and the image that leaves is of a less hectic, quieter, more hunkered down time – whether that is true in reality or not. Most of us at least hope for a time like that, as our lives seem to grow busier and more fractured by the day.

In seeking to be our constant companion through all this, radio has largely grown to reflect that staccato existence. Formats are purportedly designed around the way we live our lives – five minutes in the kitchen, twelve minutes in the car, twenty minutes jogging, etc. In this way, commercial radio hopes to catch our attention for the ever growing string of advertising messages that give them income – and that accompany and all too often overwhelm program content.

Public radio has also taken note of the exigencies of modern life. Seeking listeners, as well as their support, more and more public radio programs seem planned around this opt-in, opt-out approach where listeners will not feel they have missed too much by being inattentive or distracted. Of course, this is all understandable and perfectly defensible.

Unfortunately, it also forces radio away from perhaps its greatest strength. As a medium focused exclusively on sound, it demands attention in order to be powerful. Popular television bombards us with sounds and images, which in the interests of art are often at odds with one another. The discord is used mostly to entertain us and sometimes to deceive us, but almost never is able to inform us. The discord itself seems to be the source of the medium's power. Words inevitably mean less than image.

This is not so with radio. Radio's art depends on its literacy. That literacy only comes through when it is able to grab and hold us. The longer it is able to do so, the more powerful the effect. But the distractions that vex us work against that and around it goes...

But now that it's winter, maybe we can find the time to listen at lei-

sure. That would be all to the good because there are still fine programs on the short waves that demand our attention, and offer us so much in return. Here are four of the best:

THE SUNDAY EDITION

R. Canada Int.

S 1400-1700

This may be my favorite.

The Sunday Edition is the latest in a line of early Sunday audio magazines (dare I say rotogravure?) that have been on the domestic CBC Radio schedule for years. When longtime CBC journalist Michael Enright took over the helm five years ago (it was then called *Sunday Morning*), the program took some time to find its bearings. His background belonged more to the pitbull school of investigative journalism appropriate to the program *As It Happens* from whence he came, and Enright at first seemed uncomfortable in a more conversational mode. Over time, though, he has better molded his on-air persona to the more relaxed Sunday morning atmosphere, and the program, in turn, has molded itself to him. This is all to the good for the listener.

Three hours allow the interviews, conversations, essays and documentaries on *The Sunday Edition* to run their normal course, virtually free of artificially invoked time restraints. It gives them all the opportunity to soar and most times they do just that. The show is beautifully paced, and carefully selected jazz pieces, an obvious Enright obsession, are interspersed throughout. While the various segments of the program can stand on their own, it is when one takes the time to hear the entire presentation that one sees how *The Sunday Edition* is so artfully put together week to week. This is simply an intelligent encounter with arts and letters, a near perfect radio experience for a Sunday morning.

PLAY OF THE WEEK

BBC World Service

S 0001-0100 or 0130 (Americas stream)

This is the only place on radio to regularly hear the best in classic and contemporary theatre. The quality of the productions are consistently high – a wireless equivalent of the best on offer from New York's Broadway and London's West End. There are also month-long festivals of non-Western theatre

and an annual playwrighting competition that culminates in performances of the prize-winning entries.

Of all the genres of radio programming, drama may demand the most of the listener. The rewards more than compensate.

THE SOUND FOUNTAIN

R. Netherlands

S 1200, 1530; M 0030; H 1230, 1500; F 0000, 0500

The Sound Fountain can be said to be the alter-ego of *Aural Tapestry*. They share the same time slots – the former running in the winter schedule; the latter during the summer. Both place a premium on sound, using it in unique ways to provide the listener with a deeper experience of the topics the producers seek to explore. Both programs demonstrate, as do all **Radio Netherlands** programming, a keen understanding of radio as a distinct art form. However, that is where the similarity ends, for *Aural Tapestry*'s brief is culture while *The Sound Fountain*'s is quite literally the world.

Dheera Sujan and Michelle Ernsting are, in essence, producing documentaries; but not documentaries in the traditional sense. Not when the topics covered include different views of Utopia or tracing the use of ancient mythological structures in today's cinema. These soundscapes are deeply intellectual exercises made accessible through the innovative application of sound. Sujan and Ernsting look at their subjects from unique angles offering listeners a truly creative way of looking at the world.

And all you need to invest is a half-hour a week!

THE MARGARET THROSBY INTERVIEW

R. Australia

M-F 0405-0500

Widely recognized as Australian radio's best interviewer, Margaret Throsby converses with people from all walks of life. Guests bring a little more to the table – personal selections of music that have special meaning for them. These conversations regularly run deeper than your common interview, but Ms. Throsby's manner – while probing – is always correct and friendly. Many of the interviewees will be unfamiliar to a North American listener, but this is of no matter. Apart from Ms. Throsby's consummate professionalism, that may be the program's best recommendation.

(An added advantage: all have content available on-demand via the Internet.)

Happy Holidays!





HOW TO USE THE SHORTWAVE GUIDE

0000-0100 twhfa USA, Voice of America 5995am 6130ca 7405am 9455af
 ① ② ⑤ ③ ④ ⑥ ⑦

Convert your time to UTC.

Broadcast time on ① and time off ② are expressed in Coordinated Universal Time (UTC) – the time at the 0 meridian near Greenwich, England. To translate your local time into UTC, first convert your local time to 24-hour format, then add (during Standard Time) 5, 6, 7, or 8 hours for Eastern, Central, Mountain or Pacific Times, respectively. Eastern, Central, and Pacific Times are already converted to UTC for you at the top of each page.

Note that all dates, as well as times, are in UTC; for example, a show which might air at 0030 UTC *Sunday* will be heard on *Saturday* evening in America (in other words, 7:30 pm Eastern, 6:30 pm Central, etc.).

Find the station you want to hear.

Look at the page which corresponds to the time you will be listening. On the top half of the page English broadcasts are listed by UTC time on ①, then alphabetically by country ③, followed by the station name ④. (If the station name is the same as the country, we don't repeat it, e.g., "Vanuatu, Radio" [Vanuatu].)

If a broadcast is not daily, the days of broadcast ⑤ will appear in the column following the time of broadcast, using the following codes:

Day Codes

s/S	Sunday
m/M	Monday
t/T	Tuesday
w/W	Wednesday
h/H	Thursday
f/F	Friday
a/A	Saturday
D	Daily
mon/MON	monthly

In the same column ⑤, irregular broadcasts are indicated "tent" and programming which includes languages besides English are coded "vl" (various languages).

Choose the most promising frequencies for the time, location and conditions.

The frequencies ⑥ follow to the right of the station listing; all frequencies are listed in kilohertz (kHz). Not all listed stations will be heard from your location and virtually none of them will be heard all the time on all frequencies.

Shortwave broadcast stations change some of their frequencies at least twice a year, in April and October, to adapt to seasonal conditions. But they can also change in response to short-

term conditions, interference, equipment problems, etc. Our frequency manager coordinates published station schedules with confirmations and reports from her monitoring team and MT readers to make the Shortwave Guide up-to-date as of one week before print deadline.

To help you find the most promising signal for your location, immediately following each frequency we've included information on the target area ⑦ of the broadcast. Signals beamed toward your area will generally be easier to hear than those beamed elsewhere, even though the latter will often still be audible.

Target Areas

af:	Africa
al:	alternate frequency (occasional use only)
am:	The Americas
as:	Asia
au:	Australia
ca:	Central America
do:	domestic broadcast
eu:	Europe
irr:	irregular (Costa Rica RFPI)
me:	Middle East
na:	North America
om:	omnidirectional
pa:	Pacific
sa:	South America
va:	various

Choose a program or station you want to hear.

Selected programs for prime listening hours appear following the frequencies – space does not permit 24 hour listings nor can every station be listed. However, listings for the most popular stations and selected lesser-known stations illustrate the variety available on shortwave. The format of the listings alternates among three different styles – by station, by genre and by day – month by month. Times listed are approximate and programs are subject to change.

The program listings emphasize broadcasts targeted to North America. In most cases, the stations and programs listed should be readily receivable in North America using a portable radio. Most broadcasters produce one broadcast in English per day that is repeated over a 24 hour period to all areas. If you are able to listen to transmissions to other areas of the world during "non-prime time" hours, referring to the prime time listings for those stations will likely be helpful in determining what programs will be broadcast.

Occasionally, a program or station listing may be followed by a reference to another listing for the same program or station at a different time. This is done to conserve space and make it possible to provide more listings.

MT MONITORING TEAM

Gayle Van Horn John Figliozi
 Frequency Manager Program Manager
 gaylevanhorn@monitoringtimes.com johnfigliozi@monitoringtimes.com

Mark Fine, VA
 markfine@monitoringtimes.com

Program Highlights

John Figliozi

Seasonal Programming

These notes are prepared in late October and at that time there is little thought given to the Holiday Season. Therefore, in assembling program notes about any special programming on offer in late December and early January, an editor has to rely on historical precedent to point readers in the right direction. Luckily, this is one area where stations have been rather consistent.

The **BBC World Service** offers a broadcast of the traditional *Festival of Nine Lessons and Carols*, live from Kings College, Cambridge, usually on Christmas Eve. One can also expect to hear other special programming, including appropriate stories on *Off the Shelf* and a play or two on *Play of the Week*, as well as at least one program celebrating Hannukah.

As *It Happens* on **R. Canada Int.** has had its own tradition of storytelling during the week or so leading up to Christmas. There likely will be special editions produced for several regular programs. Those within range of **CBC Northern Service** can hear the full *Radio One* domestic schedule on Christmas Day and New Years Day, which has several special programs offering insight into how these holidays are traditionally celebrated in Canada.

For the past few years, **R. Australia** has turned over a part of its broadcast day to its local domestic services, giving listeners a chance to hear how Christmas in summer sounds. A reminder: Melbourne (where **RA** is headquartered) is 11 hours ahead of UTC, so the programming will appear to precede Christmas for North American listeners. **R. New Zealand Int.**, which relies extensively on its domestic counterpart National Radio for program content, will have a wealth of special programming of its own.

Deutsche Welle's 24 hour *German language service* has always programmed a wide variety of Holiday music on Christmas Eve, Christmas Day, New Years' Eve and New Years Day. With one of the most powerful signals in North America, you should have no trouble locating them on the dial.

Look for **Radio Sweden**, **Radio Prague**, **HCB Ecuador** and the **VOA** to schedule special programs in the week leading up to and following Christmas. Other stations will likely follow suit. Finally, a great way to ring in the New Year is to listen to it being ushered in around the world, starting with New Zealand at 1100 UT on December 31.

May yours be merry!



0000 UTC - 7PM E / 6PM C / 4PM P

0000	0015	Cambodia, National Radio Of	11940as			
0000	0015	Japan, Radio	6145na	13650as	17810as	
0000	0030	Egypt, Radio Cairo	9900na			
0000	0030	Mexico, Radio Mexico Intl	9705am	11770am		
0000	0030	mtwhf/vl	Solomon Islands, SIBC	5020do		
0000	0030	Thailand, Radio	9680va			
0000	0030	UK, BBC World Service	3915as	5970as	11945as	17615as
0000	0030	vi	Vanuatu, Radio	4960do	7260do	
0000	0045	India, All India Radio	9705as	9950as	11620as	13605as
0000	0055	Spain, R Exterior Espana	9540am			
0000	0057	Canada, Radio Canada Intl	9755as	11895as	9755as	11895as
0000	0059	Canada, Radio Canada Intl	5960na	9590na		
0000	0100	Anguilla, Caribbean Beacon	6090am			
0000	0100	Australia, ABC NT Alice Springs	4835do			
0000	0100	Australia, ABC NT Katherine	5025do			
0000	0100	Australia, ABC NT Tennant Crk	4910do			
0000	0100	Australia, Radio	5995va	9475as	9580va	9660pa
0000	0100		11660as	12080va	15240pa	15415as
0000	0100		21725va			
0000	0100	Bulgaria, Radio	7400na	9400na		
0000	0100	Canada, CBC Northern Service	9625do			
0000	0100	Canada, CFRX Toronto ON	6070do			
0000	0100	Canada, CFVP Calgary AB	6030do			
0000	0100	Canada, CKZN St John's NF	6160do			
0000	0100	Canada, CKZU Vancouver BC	6160do			
0000	0100	Costa Rica, R for Peace Intl	7445am	15040am		
0000	0100	Costa Rica, University Network	5030am	6150am	7375am	9725sa
0000	0100	vi	Croatia, Croatian Radio	9925sa		
0000	0100		Germany, Deutsche Welle	6040am	6145am	9640am
0000	0100		9765na			
0000	0100	m/vl	Guatemala, Radio Cultural	3300do	5955do	
0000	0100	Guyana, Voice of	3290do	5950do		
0000	0100	Malaysia, Radio	7295do			
0000	0100	Namibia, NBC	3270af	3290af		
0000	0100	Netherlands, Radio	6165na	9845na		
0000	0100	New Zealand, Radio NZ Intl	17675pa			
0000	0100	Russia, University Network	9940as			
0000	0100	Singapore, SBC Radio One	6150do			
0000	0100	vi	UAE, AWR	6035as	6055as	
0000	0100		UK, BBC World Service	5975va	6195as	7105as
0000	0100		11955as	12095va	15280as	15310as
0000	0100		USA, Armed Forces Network	4319usb	4993usb	5765usb
0000	0100		6458usb	10320usb	10940usb	12579usb
0000	0100		USA, KAUJ Dallas TX	5755va		
0000	0100		USA, KIMF Otero NM	5835na		
0000	0100		USA, KTBN Salt Lk City UT	7505na		
0000	0100		USA, KWHR Naalehu HI	17510as		
0000	0100		USA, Voice of America	7215va	9890va	11760va
0000	0100		17740va	17820va	15185va	15290va
0000	0100	twhfa	USA, Voice of America	5995am	6130am	7405am
0000	0100		11695am	13710am	9455am	9775am
0000	0100		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0000	0100		USA, WEWN Birmingham AL	5825na	9355na	13615na
0000	0100		USA, WHRA Greenbush ME	7580va		
0000	0100		USA, WHRI Noblesville IN	5745va	7315am	
0000	0100		USA, WINB Red Lion PA	12160am		
0000	0100		USA, WJIE Louisville KY	7490am	13595am	
0000	0100		USA, WRMI Miami FL	7385am	9955am	
0000	0100		USA, WRMI Miami FL	7385am	9955am	
0000	0100as		USA, WSHB Cypress Creek SC	9430am		
0000	0100	wf	USA, WSHB Cypress Creek SC	9430am	15285am	
0000	0100		USA, WTJC Newport NC	9370na		
0000	0100	sm	USA, WWBS Macon GA	11900na		
0000	0100		USA, WWCR Nashville TN	3210na	5070na	7465na
0000	0100		13845na			
0000	0100		USA, WWRB Manchester TN	9320na	12170na	
0000	0100		USA, WYFR Okeechobee FL	6085na	9505na	11720na
0000	0100		Zambia, Christian Voice	4965af		
0000	0130		UAE, Gospel For Asia	6145as		
0025	0040		Sri Lanka, SLBC	6005as	9700as	15745as
0030	0100		Australia, Radio	17750as		
0030	0100		Iran, VOIRI	6065na	6135na	
0030	0100		Lithuania, R Vilnius	11690na		
0030	0100as		Russia, Bible Voice BC	7180as		
0030	0100as/vl		Solomon Islands, SIBC	5020do		
0030	0100		Thailand, Radio	13695na		
0040	0050	vi	Vatican City, Vatican Radio	7335as	9865as	
0055	0100		Italy, RAI Intl	9675na	11800na	

0100 UTC - 8PM E / 7PM C / 5PM P

0100	0115	Italy, RAI Intl	9675na	11800na		
0100	0115	vi	Pakistan, Radio	11580as	15455as	
0100	0125	Netherlands, Radio	6165na	9845na		
0100	0127	Czech Rep, Radio Prague Intl	6200na	7345na		
0100	0127	Iran, VOIRI	6065na	6135na		
0100	0127	Vietnam, Voice of	6175na			
0100	0130	Australia, Radio	17775as			
0100	0130	s	Germnay, Universal Life	9435as		
0100	0130		Hungary, Radio Budapest	9835na		
0100	0130		Slovakia, R Slovakia Intl	5930am	7230am	9440am
0100	0130		UAE, Gospel For Asia	6145as		
0100	0130	twhfa	USA, Voice of America	5995am	6130am	7405am
0100	0130		13710am		9455am	9775am
0100	0130	mtwhfa	Yugoslavia, R Yugoslavia	7115eu		
0100	0145		Germany, Deutsche Welle	6040am	6145am	9640am
0100	0156		9765na		9700na	
0100	0200		North Korea, Voice of	6195as	7140as	9345as
0100	0200		13760ca	15180ca	11735ca	
0100	0200		Anguilla, Caribbean Beacon	6090am		
0100	0200		Australia, ABC NT Katherine	5025do		
0100	0200		Australia, ABC NT Tennant Crk	4910do		
0100	0200		Australia, Radio	5995va	9475as	9580va
0100	0200		11650va	11660va	12080va	9660pa
0100	0200		17580pa	17795va	15240pa	15415as
0100	0200	vi	Austria, AWR	21725va		
0100	0200		8935as			
0100	0200		Canada, CBC Northern Service	9625do		
0100	0200		Canada, CFRX Toronto ON	6070do		
0100	0200		Canada, CFVP Calgary AB	6030do		
0100	0200		Canada, CKZN St John's NF	6160do		
0100	0200		Canada, CKZU Vancouver BC	6160do		
0100	0200		China, China Radio Intl	9580na	9790na	
0100	0200		Costa Rica, R for Peace Intl	7445am	15040am	
0100	0200		Costa Rica, University Network	5030am	6150am	7375am
0100	0200		11870am	13750na	9725sa	
0100	0200		Cuba, Radio Havana	6090na	9820na	11705usb
0100	0200		Ecuador, HCJB	9745na	21455usb	
0100	0200	m/vl	Guatemala, Radio Cultural	3300do	5955do	
0100	0200		Guyana, Voice of	3290do		
0100	0200		Indonesia, Voice of	9525va	11785af	15150af
0100	0200		Iraq, Radio Iraq Intl	9887irr	11787eu	
0100	0200		Japan, Radio	11860as	11880af	15325as
0100	0200		17810as	17835sa	17845na	17685oc
0100	0200		Malaysia, Radio	7295do		
0100	0200		Namibia, NBC	3270af	3290af	
0100	0200		New Zealand, Radio NZ Intl	17675pa		
0100	0200		Russia, University Network	9940as		
0100	0200		Singapore, SBC Radio One	6150do		
0100	0200	vi	Solomon Islands, SIBC	5020do		
0100	0200		Sri Lanka, SLBC	6005as	9700as	15745as
0100	0200		UK, BBC World Service	5975va	6195as	9410as
0100	0200		11955as	12095va	15280as	9525sa
0100	0200		Ukraine, R Ukraine Intl	5905as	9610as	9825am
0100	0200		USA, Armed Forces Network	4319usb	4993usb	5765usb
0100	0200		6350usb	6458usb	10320usb	10940usb
0100	0200		13362usb			12579usb
0100	0200		USA, KAUJ Dallas TX	5755va		
0100	0200		USA, KIMF Otero NM	5835na		
0100	0200		USA, KTBN Salt Lk City UT	7505na		
0100	0200		USA, KWHR Naalehu HI	17510as		
0100	0200		USA, Voice of America	7200va	9850va	11705va
0100	0200		15250va	15300va	17740va	11820va
0100	0200		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0100	0200		USA, WEWN Birmingham AL	5825na	9355na	13615na
0100	0200		USA, WHRA Greenbush ME	7580va		
0100	0200		USA, WHRI Noblesville IN	5745va	7315am	
0100	0200		USA, WINB Red Lion PA	12160am		
0100	0200		USA, WJIE Louisville KY	7490am	13595am	
0100	0200		USA, WRMI Miami FL	7385am	9955am	
0100	0200	twhf as	USA, WSHB Cypress Creek SC	9430na		
0100	0200		USA, WTJC Newport NC	9370na		
0100	0200	sm	USA, WWBS Macon GA	11900na		
0100	0200		USA, WWCR Nashville TN	3210na	5070na	5935na
0100	0200		USA, WWRB Manchester TN	5085va	6890va	7465na
0100	0200		USA, WYFR Okeechobee FL	6065na	9505na	15060as
0100	0200		Zambia, Christian Voice	4965af		
0110	0200as		Australia, Radio	9660va	12080pa	17580pa
0130	0145	vi	Libya, Voice of Africa	1543irr	17750irr	21725as
0130	0200		Australia, Voice International	17775as		
0130	0200		Austria, Radio Austria Intl	9870na		

SELECTED PROGRAMMING BEGINS ON PAGE 55

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0130	0200	Sweden, Radio	9490va				
0130	0200	UK, RTE Radio	6155na				
0130	0200	twfha	USA, Voice of America	5995am	6130am	7405am	9455am 9775am
			13740am				

0200 UTC - 9PM E / 8PM C / 6PM P

0200	0227	Czech Rep, Radio Prague Intl	6200na	7345na			
0200	0230	twfha	Argentina, RAE	6060am	11710am		
0200	0230	sm w fa	Belarus, Radio Belarus Intl	6070eu	7210eu		
0200	0230		Myanmar, Radio	7185do			
0200	0230		Russia, Bible Voice BC	9610as			
0200	0230as/vl		Solomon Islands, SIBC	5020do			
0200	0230		Yugoslavia, R Yugoslavia	7130eu			
0200	0245		Germany, Deutsche Welle	7285as	9765as	11965as	13605as
0200	0256		North Korea, Voice of	11845as			
0200	0257		Canada, Radio Canada Intl	15150as	17860as		
0200	0259		Canada, Radio Canada Intl	6040am	9755am	11725am	
0200	0300		Anguilla, Caribbean Beacon	6090am			
0200	0300		Australia, ABC NT Alice Springs	4835do			
0200	0300		Australia, ABC NT Katherine	5025do			
0200	0300		Australia, ABC NT Tennant Crk	4910do			
0200	0300		Australia, Radio	5995va	9475as	9580va	9660pa 11650va
			12080va	15240pa	15415as	15515as	17580pa 17750as 21725va
0200	0300as		Australia, Radio	9660va	12080pa	17580pa	21725as
0200	0300		Canada, CBC Northern Service	9625do			
0200	0300		Canada, CFRX Toronto ON	6070do			
0200	0300		Canada, CFVP Calgary AB	6030do			
0200	0300		Canada, CKZN St John's NF	6160do			
0200	0300		Canada, CKZU Vancouver BC	6160do			
0200	0300		Costa Rica, R for Peace Intl	7445am	15040am		
0200	0300		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am	13750na			
0200	0300	vl	Croatia, Croatian Radio	9925sa			
0200	0300	vl	Croatia, Croatian Radio	9925na			
0200	0300		Cuba, Radio Havana	6090na	9820na	11705usb	
0200	0300		Ecuador, HCJB	9745na	12040as	21455usb	
0200	0300		Egypt, Radio Cairo	9475na			
0200	0300	my/vl	Guatemala, Radio Cultural	3300do	5955do		
0200	0300		Guyana, Voice of	3290do	5950do		
0200	0300		Kenya, Kenya BC Corp	4885do	4935do		
0200	0300		Malaysia, Radio	7295do			
0200	0300		Namibia, NBC	3270af	3290af		
0200	0300		New Zealand, Radio NZ Intl	17675pa			
0200	0300		Philippines, Radio Pilipinas	12015as	15120as	15270as	
0200	0300		Romania, R Romania Intl	9510na	11810na	11940as	15105as
			15180pa	17815pa			
0200	0300		Russia, University Network	9940as			
0200	0300		Russia, Voice of Russia	7125na	7240na	7260na	7440na
			12010na	15595na	17595na		
0200	0300		Singapore, SBC Radio One	6150do			
0200	0300	mtwhf/vl	Solomon Islands, SIBC	5020do			
0200	0300		South Korea, R Korea Intl	9560va	11810va	15575va	
0200	0300		Sri Lanka, SLBC	6005as	9700as	15745as	
0200	0300		Taiwan, R Taipei Intl	5950na	9680na	11740na	15320as 15345as
0200	0300		UK, BBC World Service	5975va	6005af	9410me	9525am 9770af
			9825sa	11760va	11955as	12035af	12095as 15310as
			15360as	17790as			
0200	0300		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
			6458usb	10320usb	10940usb	12579usb	13362usb
0200	0300		USA, KAUJ Dallas TX	5755va			
0200	0300		USA, KIMF Otero NM	5835na			
0200	0300		USA, KJES Vado NM	7555na			
0200	0300		USA, KTBN Salt Lk City UT	7505na			
0200	0300		USA, KWHR Naalehu HI	17510as			
0200	0300		USA, Voice of America	7200va	9850va	11705va	11820va 15250va
			15300va	17740va	17820va		
0200	0300		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na	
0200	0300		USA, WEWN Birmingham AL	5825na	9355na	13615na	
0200	0300		USA, WHRA Greenbush ME	7580va			
0200	0300		USA, WHRI Noblesville IN	5745va	7315am		
0200	0300		USA, WINB Red Lion PA	12160am			
0200	0300		USA, WJIE Louisville KY	7490am	13595am		
0200	0300		USA, WRMI Miami FL	7385am	9955am		
0200	0300	s	USA, WSHB Cypress Creek SC	9430na			
0200	0300	h	USA, WSHB Cypress Creek SC	7535am			
0200	0300		USA, WTJC Newport NC	9370na			
0200	0300		USA, WWCN Nashville TN	3210na	5070na	5935na	7465na
0200	0300		USA, WWRB Manchester TN	5085va	6890va		
0200	0300		USA, WYFR Okeechobee FL	6065na	9505na		
0200	0300		Zambia, Christian Voice	4965af			
0200	1215		Cambodia, National Radio Of	11940as			
0200	0220		Nepal, Radio	3230as	5005as	6100as	
0230	0257		Vietnam, Voice of	6175na			

0230	0300	Sweden, Radio	9495na				
0230	0300	vl	Zambia, Radio ZNBC	4910do	6265al		
0245	0300	twfha	Albania, Radio Tirana Intl	6115na	7160eu		
0250	0300		Vatican City, Vatican Radio	7305am	9605am		

0300 UTC - 10PM E / 9PM C / 7PM P

0300	0310	Vatican City, Vatican Radio	9660af				
0300	0330	Australia, Radio	9580va				
0300	0330	Egypt, Radio Cairo	9475na				
0300	0330	Philippines, Radio Pilipinas	12015as	15120as	15270as		
0300	0330	South Africa, Channel Africa	9525af				
0300	0330	Thailand, Radio	15460na				
0300	0330	a	UK, Wales Radio Intl	9735na			
0300	0330		USA, KJES Vado NM	7555na			
0300	0345		Germany, Deutsche Welle	11985na	6020na	6045na	9640am 9700na
0300	0356		North Korea, Voice of	6195as	7140as	9345as	
0300	0358		Hungary, Radio Budapest	9835na			
0300	0400		Anguilla, Caribbean Beacon	6090am			
0300	0400		Australia, ABC NT Alice Springs	4835do			
0300	0400		Australia, ABC NT Katherine	5025do			
0300	0400		Australia, ABC NT Tennant Crk	4910do			
0300	0400		Australia, Radio	5995va	9500pa	9660pa	9815pa 11650va
			12080va	15240pa	15415as	15515va	17580pa 17750as 21725va
0300	0400	as	Australia, Radio	9660va	12080pa	17580pa	21725as
0300	0400	vl	Botswana, Radio	3356do	4820do	7255do	
0300	0400		Bulgaria, Radio	7400na	9400na		
0300	0400		Canada, CBC Northern Service	9625do			
0300	0400		Canada, CFRX Toronto ON	6070do			
0300	0400		Canada, CFVP Calgary AB	6030do			
0300	0400		Canada, CKZN St John's NF	6160do			
0300	0400		Canada, CKZU Vancouver BC	6160do			
0300	0400		China, China Radio Intl	9560na	9690na		
0300	0400		Costa Rica, R for Peace Intl	7455am	15040am		
0300	0400		Costa Rica, University Network	5030am	6150am	7375am	9725sa
			11870am	13750na	17645as		
0300	0400		Cuba, Radio Havana	6090na	9820na	11705usb	
0300	0400		Ecuador, HCJB	9745na	12040as	21455usb	
0300	0400	vl	Guatemala, Radio Cultural	3300do	5955do		
0300	0400		Guyana, Voice of	3290do	5950do		
0300	0400		Japan, Radio	17825ca	21610oc		
0300	0400		Kenya, Kenya BC Corp	4885do	4935do		
0300	0400		Malaysia, Radio	7295do			
0300	0400		Namibia, NBC	3270af	3290af		
0300	0400		New Zealand, Radio NZ Intl	17675pa			
0300	0400		Oman, Radio	15355va			
0300	0400		Russia, University Network	17765as			
0300	0400		Russia, Voice of Russia	7125na	7240na	7260na	7350na 7440na
			12010na	15595na	17565na	17595na	
0300	0400		Singapore, SBC Radio One	6150do			
0300	0400	mtwhf/vl	Solomon Islands, SIBC	5020do			
0300	0400		Sri Lanka, SLBC	6005as	9700as	15745as	
0300	0400		Taiwan, R Taipei Intl	5950na	9680na	11875as	15320as
0300	0400		Uganda, Radio	4976do	5026al	7195al	
0300	0400		UK, BBC World Service	3255af	5975va	6005af	6190af 6195eu
0300	0400		7160af	9410va	9525am	11760va	11765af 12035af 12095as
			15280as	15310as	15360as	15575va	17760as 17790as 21660as
0300	0400		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
			6458usb	10320usb	10940usb	12579usb	13362usb
0300	0400		USA, KAUJ Dallas TX	5755va			
0300	0400		USA, KIMF Otero NM	5835na			
0300	0400		USA, KTBN Salt Lk City UT	7505na			
0300	0400		USA, KWHR Naalehu HI	17510as			
0300	0400		USA, Voice of America	4960af	6035af	6080af	7265af 7290af
			7340af	7415af	9575af	9885af	
0300	0400		USA, WBCQ Kennebunk, ME	7415na	9335na	11660na	
0300	0400		USA, WEWN Birmingham AL	5825na	7425na	13615na	
0300	0400		USA, WHRA Greenbush ME	7580va			
0300	0400		USA, WHRI Noblesville IN	5745va	7315am		
0300	0400		USA, WINB Red Lion PA	12160am			
0300	0400		USA, WJIE Louisville KY	7490am	13595am		
0300	0400		USA, WRMI Miami FL	7385am			
0300	0400		USA, WWCN Nashville TN	3210na	5070na	5935na	7465na
0300	0400		USA, WWRB Manchester TN	5085va	6890va		
0300	0400		USA, WYFR Okeechobee FL	5985na	6065na	9505na	
			11855na				
0300	0400		Zambia, Christian Voice	6065af			
0300	0400	vl	Zambia, Radio ZNBC	4910do	6265al		
0330	0345	vl	Libya, Voice of Africa	15435irr	17750irr		
0330	0350		UAE, Emirates Radio	12005na	13675na	15395na	
0330	0357		Vietnam, Voice of	6175na			
0330	0400	twfha	Albania, Radio Tirana Intl	6115na	7160eu		

Shortwave Guide



0330	0400	Malaysia, RTM Kota Kinabalu	5979do		
0330	0400	Nigeria, Radio/Kaduna	4770do		
0330	0400	Nigeria, Radio/Lagos	3326do	4990al	
0330	0400	Sweden, Radio	9495na		
0330	0400	UK, BBC World Service	15420af		
0345	0400	f Seychelles, FEBA Radio	11880af		
0345	0400	Tajikistan, Radio	4760as	7245al	

0400 UTC - 11PM E / 10PM C / 8PM P

0400	0425	Belgium, Radio Vlaanderen Intl	11985na		
0400	0427	Czech Rep, Radio Prague Intl	7345na	7385na	9435na
0400	0430	mtwhf France Radio France Intl	11910af		
0400	0430	vi Guatemala, Radio Cultural	3300do	5955do	
0400	0430	twhtas Mexico, Radio Mexico Intl	9705am	11770am	
0400	0430	South Africa, AWR	7235af		
0400	0430	South Africa, Channel Africa	5955af		
0400	0430	Sri Lanka, SLBC	6005as	9700as	15745as
0400	0445	Germany, Deutsche Welle	6180af	7195af	9565af 9710af
0400	0445	USA, WYFR Okeechobee FL	6065na	9505na	9985eu 11530eu
0400	0450	Turkey, Voice of	6020va	7240va	
0400	0500	Anguilla, Caribbean Beacon	6090am		
0400	0500	Australia, ABC NT Alice Springs	4835do		
0400	0500	Australia, ABC NT Katherine	5025do		
0400	0500	Australia, ABC NT Tennant Crk	4910do		
0400	0500	Australia, Radio	5995va	6080pa	7240pa 9500as 9660pa
			9815pa	11650va	12080va
			17580pa	21725va	
0400	0500	as Australia, Radio	9660va	12080pa	17580pa
0400	0500	vi Botswana, Radio	3356do	4820do	7255do
0400	0500	Canada, CBC Northern Service	9625do		
0400	0500	Canada, CFRX Toronto ON	6070do		
0400	0500	Canada, CKZN St John's NF	6160do		
0400	0500	Canada, CKZU Vancouver BC	6160do		
0400	0500	China, China Radio Intl	9560na	9730na	
0400	0500	Costa Rica, R for Peace Intl	7455am	15040am	
0400	0500	Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am	13750na	17645as
0400	0500	vi Croatia, Croatian Radio	9925na		
0400	0500	Cuba, Radio Havana	6090na	9820na	11705usb
0400	0500	Ecuador, HCJB	9745na	21455usb	
0400	0500	Guyana, Voice of	3290do	5950do	
0400	0500	Kenya, Kenya BC Corp	4885do	4935do	
0400	0500	Malaysia, Radio	7295do		
0400	0500	Malaysia, RTM Kota Kinabalu	5979do		
0400	0500	Malaysia, Voice of	6175as		
0400	0500	Namibia, NBC	3270af	3290af	
0400	0500	New Zealand, Radio NZ Intl	17675pa		
0400	0500	Nigeria, Radio/Kaduna	4770do	6090do	
0400	0500	Nigeria, Radio/Lagos	3326do	4990al	
0400	0500	Nigeria, Voice of	7255af		
0400	0500	Romania, R Romania Intl	9510na	11940na	17735as 21480as
0400	0500	Russia, University Network	17765as		
0400	0500	Russia, Voice of Russia	7180na	7240na	7260as 7350va
			17650na	17660na	17690na
0400	0500	Singapore, SBC Radio One	6150do		
0400	0500	mtwhf/vi Solomon Islands, SLBC	5020do		
0400	0500	Uganda, Radio	4976do	5026al	7195al
0400	0500	UK, BBC World Service	3255af	6005af	6135am 6190af 6195eu
0400	0500		7160af	9410va	9525am 11760va 12035af 12095as
			15280as	15310as	15360as
			21660as	15420af	15575va 17760as 17790as
0400	0500	Ukraine, R Ukraine Intl	6020as	7285as	9810as
0400	0500	USA, Armed Forces Network	4319usb	4993usb	5765usb 6350usb
			6458usb	10320usb	10940usb
0400	0500	USA, KAUJ Dallas TX	5755va		
0400	0500	USA, KIMF Otero NM	5835na		
0400	0500	USA, KTBN Salt Lk City UT	7505na		
0400	0500	USA, KWHR Naalehu HI	17780as		
0400	0500	USA, Voice of America	4960af	6080af	7170va 7290af 9525af
			9775af	9885af	15205af
0400	0500	USA, WBCQ Kennebunk, ME	7415na	9335na	11660na
0400	0500	USA, WEWN Birmingham AL	5825na	7425na	13615na
0400	0500	USA, WHRA Greenbush ME	7580va		
0400	0500	USA, WHRI Noblesville IN	5745va	7315am	
0400	0500	USA, WINB Red Lion PA	12160am		
0400	0500	USA, WJIE Louisville KY	7490am	13595am	
0400	0500	USA, WMLK Bethel PA	9465eu	9955eu	
0400	0500	USA, WRMI Miami FL	7385am		
0400	0500	tha USA, WSHB Cypress Creek SC	12020af		
0400	0500	USA, WTJC Newport NC	9370na		
0400	0500	USA, WWCN Nashville TN	3210na	5070na	5935na 7465na
0400	0500	USA, WWRB Manchester TN	5085va	6890va	
0400	0500	Zambia, Christian Voice	6065af		

0400	0500	vi Zambia, Radio ZNBC	4910do	6265al	
0404	0500	USA, WYFR Okeechobee FL	9715na		
0427	0500	a Madagascar, Radio VO Hope	12060af	15320af	
0430	0457	Czech Rep, Radio Prague Intl	9865va	11600va	
0430	0500	Australia, Radio	17750as		
0430	0500	Germany, Voice of Hope	15715me		
0430	0500	Netherlands, Radio	6165na	9590na	
0430	0500	Nigeria, Radio/Enugu	6025do		
0430	0500	Nigeria, Radio/Ibadan	6050do		
0430	0500	South Africa, AWR	11975af		
0430	0500	Swaziland, TWR	4775af		
0430	0500	mtwhfa Swaziland, TWR	3200af		
0430	0500	vi UAE, AWR	15160as		
0445	0500	Italy, RAI Intl	6100af		
0450	0800	a Monaco, TWR	9870eu		

0500 UTC - 12AM E / 11PM C / 9PM P

0500	0505	New Zealand, Radio NZ Intl	17675pa		
0500	0515	Israel, Kol Israel	6280va	9435va	11605va 17600va
0500	0520	Vatican City, Vatican Radio	9660af	11625af	15570af
0500	0525	a Madagascar, Radio VO Hope	12060af	15320af	
0500	0530	Australia, Radio	9500as		
0500	0530	mtwhf France Radio France Intl	13610af	15155af	
0500	0530	twhta Mexico, Radio Mexico Intl	9705am		11770am
0500	0530	Netherlands, Radio	6165na	9590na	
0500	0530	South Africa, AWR	5960af	6015af	
0500	0530	South Africa, Channel Africa	11710af		
0500	0530	Uganda, Radio	4976do	5026al	7195al
0500	0530	UK, BBC World Service	15280as		
0500	0545	Germany, Deutsche Welle	11795na	5960na	6120na 9670na
0500	0600	Anguilla, Caribbean Beacon	6090am		
0500	0600	Australia, ABC NT Alice Springs	4835do		
0500	0600	Australia, ABC NT Katherine	5025do		
0500	0600	Australia, ABC NT Tennant Crk	4910do		
0500	0600	Australia, Radio	5995va	6080pa	7240pa 9660pa 9815pa
			11880va	12080va	15240pa
			15415as	15515va	17580pa 21725as
0500	0600	as Australia, Radio	9660va	12080pa	17580pa
0500	0600	mtwhf Bhutan, Bhutan BC Service	5030al		
0500	0600	vi Botswana, Radio	3356do	4820do	7255do
0500	0600	Canada, CBC Northern Service	9625do		
0500	0600	Canada, CFRX Toronto ON	6070do		
0500	0600	Canada, CKZN St John's NF	6160do		
0500	0600	Canada, CKZU Vancouver BC	6160do		
0500	0600	Costa Rica, R for Peace Intl	7455am		
0500	0600	Costa Rica, University Network	5030am	6150am	7375am 9725sa
			11870am	13750na	17645as
0500	0600	Cuba, Radio Havana	9550na	9820na	9830usb
0500	0600	Ecuador, HCJB	9745na	21455usb	
0500	0600	Germany, Voice of Hope	15715me		
0500	0600	Guyana, Voice of	3290do	5950do	
0500	0600	Japan, Radio	5975eu	6110na	7230eu 9835eu 15195as
			13630na	15195as	17810as
			21755oc		
0500	0600	Kenya, Kenya BC Corp	4885do	4935do	
0500	0600	Liberia, R Liberia Intl	6100do		
0500	0600	Malaysia, Radio	7295do		
0500	0600	Malaysia, RTM Kota Kinabalu	5979do		
0500	0600	Malaysia, Voice of	6175as	9750as	15295as
0500	0600	Namibia, NBC	3270af	3290af	
0500	0600	Nigeria, Radio/Enugu	6025do		
0500	0600	Nigeria, Radio/Ibadan	6050do		
0500	0600	Nigeria, Radio/Kaduna	4770do	6090do	9570do
0500	0600	Nigeria, Radio/Lagos	3326do	4990al	
0500	0600	Nigeria, Voice of	7255af		
0500	0600	Russia, University Network	17765as		
0500	0600	Russia, Voice of Russia	7180as	7240au	7260as 7350va
0500	0600	Singapore, SBC Radio One	6150do		
0500	0600	vi Solomon Islands, SLBC	5020do		
0500	0600	Swaziland, TWR	4775af	6035af	9500af
0500	0600	UK, BBC World Service	6005af	6135am	6190af 6195eu 7160af
			9410va	11760va	11940af 11955as 15310as 15360as
			15420af	15565va	15575va 17640af 17760as 17790as 17885af
			21660as		
0500	0600	USA, Armed Forces Network	4319usb	4993usb	5765usb 6350usb
			6458usb	10320usb	10940usb
0500	0600	USA, KAUJ Dallas TX	5755va		
0500	0600	USA, KIMF Otero NM	5835na		
0500	0600	USA, KTBN Salt Lk City UT	7505na		
0500	0600	USA, KWHR Naalehu HI	17780as		
0500	0600	USA, Voice of America	6035af	6080af	7170va 7295af 9700va
			11825va	11835af	13710af
			15205va		
0500	0600	USA, WBCQ Kennebunk, ME	7415na		
0500	0600	USA, WEWN Birmingham AL	5825na	7425na	13615na

Shortwave Guide



0500	0600	USA, WHRA Greenbush ME	7580va			
0500	0600	USA, WHRI Noblesville IN	5745va	7315am		
0500	0600	USA, WINB Red Lion PA	12160am			
0500	0600	USA, WJIE Louisville KY	7490am	13595am		
0500	0600	USA, WMLK Bethel PA	9465eu	9955eu		
0500	0600	USA, WRMI Miami FL	7385am			
0500	0600	twfhas USA, WSHB Cypress Creek SC	12020af			
0500	0600	USA, WTJC Newport NC	9370na			
0500	0600	USA, WWCN Nashville TN	3210na	5070na	5935na	7465na
0500	0600	USA, WWRB Manchester TN	5085va	6890va		
0500	0600	USA, WYFR Okeechobee FL	5810na			
0500	0600	Zambia, Christian Voice	6065af			
0506	0600	New Zealand, Radio NZ Intl	15340pa			
0525	0600	vi Ghana, Ghana BC Corp	3366do	4915do		
0530	0550	UAE, Emirates Radio	15435au	17830au	21695au	
0530	0600	Australia, Radio	17750as			
0530	0600	Austria, Radio Austria Intl	6155eu	13730eu	17870me	
0530	0600	South Africa, AWR	15105af			
0530	0600	Thailand, Radio	13780eu			

0600 UTC - 1AM E / 12AM C / 10PM P

0600	0620	Vatican City, Vatican Radio	4005af	5890eu	7250eu	
0600	0630	mtwhf France Radio France Intl	11710af	15155af		
0600	0630	South Africa, AWR	15105af			
0600	0630	South Africa, Channel Africa	15215af			
0600	0630	vi Zimbabwe, ZBC Corp	5975do			
0600	0645	Germany, Deutsche Welle	7225af	9565af	11785af	
0600	0700	Anguilla, Caribbean Beacon	6090am			
0600	0700	Australia, ABC NT Alice Springs	4835do			
0600	0700	Australia, ABC NT Katherine	5025do			
0600	0700	Australia, ABC NT Tennant Crk	4910do			
0600	0700	Australia, Radio	7240va	9660pa	9815pa	11880va
		13620as	15320as	15240pa	15515va	17580pa
		21725va				
0600	0700	as Australia, Radio	9660va	12080pa	17580pa	21725as
0600	0700	vi Botswana, Radio	4820do	7255do		
0600	0700	Canada, CFRX Toronto ON	6070do			
0600	0700	Canada, CFVP Calgary AB	6030do			
0600	0700	Canada, CKZN St John's NF	6160do			
0600	0700	Canada, CKZU Vancouver BC	6160do			
0600	0700	Costa Rica, R for Peace Intl	7455am			
0600	0700	Costa Rica, University Network	5030am	6150am	7375am	9725sa
		11870am	13750na	17645as		
0600	0700	Cuba, Radio Havana	9550na	9820na	9830usb	
0600	0700	Germany, Deutsche Welle	6140eu			
0600	0700	vi Ghana, Ghana BC Corp	3366do	4915do		
0600	0700	Greece, Voice of	9420eu	15630eu		
0600	0700	Guyana, Voice of	3290do	5950do		
0600	0700	Japan, Radio	7230eu	9835na	11715va	11760va
		15195as	17870pa	21755oc		
0600	0700	Kenya, Kenya BC Corp	4885do	4935do		
0600	0700	ireg Liberia, ELWA	4760do			
0600	0700	Liberia, R Liberia Intl	6100do			
0600	0700	Malaysia, Radio	7295do			
0600	0700	Malaysia, Voice of	6175as	9750as	15295as	
0600	0700	Namibia, NBC	3270af	3290af		
0600	0700	New Zealand, Radio NZ Intl	15340pa			
0600	0700	Nigeria, Radio/Enugu	6025do			
0600	0700	Nigeria, Radio/Ibadan	6050do			
0600	0700	Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0600	0700	Nigeria, Radio/Lagos	3326do	4990al		
0600	0700	Nigeria, Voice of	7255af			
0600	0700	Romania, R Romania Intl	9635na	11940na		
0600	0700	Russia, University Network	17765as			
0600	0700	Russia, Voice of Russia	7180as	7240au	7260as	7350va
		21790au				
0600	0700	Singapore, SBC Radio One	6150do			
0600	0700	vi Solomon Islands, SIBC	5020do			
0600	0700	Swaziland, TWR	4775af	6035af	9500af	
0600	0700	UK, BBC World Service	6055af	6190af	6195eu	7160af
		11765af	11940af	11955as	12095va	15360as
		15575va	17640af	17760as	17790as	17885af
						21660as
0600	0700	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
		6458usb	10320usb	10940usb	12579usb	12689usb
0600	0700	USA, KALJ Dallas TX	5755va			
0600	0700	USA, KIMF Otero NM	5835na			
0600	0700	USA, KTBN Salt Lk City UT	7505na			
0600	0700	USA, KWHN Naalehu HI	17780as			
0600	0700	USA, Voice of America	5995va	6035af	6105af	6080af
		7170va	7295af	11825va	11930va	11995af
		15205va				13710af
0600	0700	USA, WBCQ Kennebunk, ME	7415na			
0600	0700	USA, WEWN Birmingham AL	5825na	7425na	13615na	

0600	0700	USA, WHRA Greenbush ME	7580va			
0600	0700	USA, WHRI Noblesville IN	5745va	7315am		
0600	0700	USA, WJIE Louisville KY	7490am	13595am		
0600	0700	USA, WMLK Bethel PA	9465eu	9955eu		
0600	0700	USA, WRMI Miami FL	7385am			
0600	0700	wfa USA, WSHB Cypress Creek SC	7535af			
0600	0700	USA, WTJC Newport NC	9370na			
0600	0700	USA, WWCN Nashville TN	3210na	5070na	5935na	7465na
0600	0700	USA, WWRB Manchester TN	5085va	6890va		
0600	0700	USA, WYFR Okeechobee FL	7355eu	11530eu		
0600	0700	vi Vanuatu, Radio	4960do	7260do		
0600	0700	Yemen, Rep of Yemen Radio	9780me			
0600	0700	Zambia, Christian Voice	9865af			
0600	0700	vi Zambia, Radio ZNBC	4910do	6265al		
0630	0700	mtwhf/vl Italy, IRRS	13840va			
0630	0700	Vatican City, Vatican Radio	11625af	13765af	15570af	
0637	0656	Romania, R Romania Intl	7105eu	9625eu	9550eu	11775eu

0700 UTC - 2AM E / 1AM C / 11PM P

0700	0705	New Zealand, Radio NZ Intl	15340pa			
0700	0730	mtwhf/vl Italy, IRRS	13840va			
0700	0730	Slovakia, R Slovakia Intl	13715au	15460au	17550au	
0700	0730	UK, BBC World Service	6005af			
0700	0730	vi/mtwhf Vatican City, Vatican Radio	9645af	11740eu	15595as	
						4005eu
						5980eu
						6185eu
						7250eu
0700	0745	USA, WYFR Okeechobee FL	7355eu			
0700	0750	Swaziland, TWR	4775af	6035af	9500af	
0700	0800	Anguilla, Caribbean Beacon	6090am			
0700	0800	Australia, ABC NT Alice Springs	4835do			
0700	0800	Australia, ABC NT Katherine	5025do			
0700	0800	Australia, ABC NT Tennant Crk	4910do			
0700	0800	Australia, Radio	7240va	9660pa	11880va	13620as
		15320as	15420va	15415as	17580pa	17750as
		21740va				
0700	0800	vi Botswana, Radio	4820do	7255do		
0700	0800	Canada, CFRX Toronto ON	6070do			
0700	0800	Canada, CFVP Calgary AB	6030do			
0700	0800	Canada, CKZN St John's NF	6160do			
0700	0800	Canada, CKZU Vancouver BC	6160do			
0700	0800	Costa Rica, R for Peace Intl	7455am			
0700	0800	Costa Rica, University Network	5030am	6150am	7375am	9725sa
		11870am	13750na	17645as		
0700	0800	Ecuador, HCJB	5965eu	11755pa	21455usb	
0700	0800	mtwhf Eqt Guinea, Radio Africa	15185af			
0700	0800	as/vl Eqt. Guinea, Radio East Africa	15185af			
0700	0800	mtwhf France Radio France Intl	15605af			
0700	0800	Germany, Deutsche Welle	6140eu			
0700	0800	Germany, Voice of Hope	5975eu			
0700	0800	vi Ghana, Ghana BC Corp	3366do	4915do		
0700	0800	vi Greece, Voice of	9420eu	15630eu		
0700	0800	Guyana, Voice of	3290do	5950do		
0700	0800	Kenya, Kenya BC Corp	4885do	4935do		
0700	0800	ireg Liberia, ELWA	4760do			
0700	0800	Liberia, R Liberia Intl	6100do			
0700	0800	Malaysia, Radio	7295do			
0700	0800	Malaysia, RTM Kota Kinabalu	5979do			
0700	0800	Malaysia, Voice of	6175as	9750as	15295as	
0700	0800	Myanmar, Radio	9730do			
0700	0800	Nigeria, Radio/Enugu	6025do			
0700	0800	Nigeria, Radio/Ibadan	6050do			
0700	0800	Nigeria, Radio/Kaduna	4770do	6090do	9570do	
0700	0800	Nigeria, Radio/Lagos	3326do	4990al		
0700	0800	Palau, KHBV/VO Hope	9965as	9985as	15725as	
0700	0800	Papua New Guinea, NBC	4890do	9675al		
0700	0800	Romania, R Romania Intl	21530af			
0700	0800	Russia, University Network	17765as			
0700	0800	Russia, Voice of Russia	7180as	7240au	7260as	7350va
		17685au	17795as			
0700	0800	Singapore, SBC Radio One	6150do			
0700	0800	vi Solomon Islands, SIBC	5020do			
0700	0800	Taiwan, R Taipei Intl	5950na			
0700	0800	UK, BBC World Service	6190af	6195eu	9410eu	11760va
		11940af	11955as	12095va	15310as	15360as
						15400af
						15485va
						17760as
						17790as
						17885af
						21660as
0700	0800	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb
		6458usb	10320usb	10940usb	12579usb	12689usb
0700	0800	USA, KALJ Dallas TX	5755va			
0700	0800	USA, KIMF Otero NM	5835na			
0700	0800	USA, KTBN Salt Lk City UT	7505na			
0700	0800	USA, KWHN Naalehu HI	11565pa	17780as		
0700	0800	USA, WEWN Birmingham AL	5825na	7425na	13615na	
0700	0800	USA, WHRA Greenbush ME	7580va			
0700	0800	USA, WHRI Noblesville IN	5745va	7315am		

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MT

0700	0800	USA, WJIE Louisville KY	7490am	13595am				
0700	0800	USA, WMLK Bethel PA	9465eu	9955eu				
0700	0800	if	USA, WSHB Cypress Creek SC	7535af				
0700	0800		USA, WTJC Newport NC	9370na				
0700	0800		USA, WWCN Nashville TN	3210na	5070na	5935na	7465na	
0700	0800		USA, WYFR Okeechobee FL	9985af	11580af			
0700	0800	vi	Vanuatu, Radio	4960do	7260do			
0700	0800		Zambia, Christian Voice	9865af				
0700	0800	vi	Zambia, Radio ZNBC	4910do	6265al			
0706	0800		New Zealand, Radio NZ Intl	11675pa				
0730	0800		Australia, Radio	11695as				
0730	0800	vi	Austria, AWR	17820va				
0730	0800		Bulgaria, Radio	12000eu	13600eu			
0730	0800	th	Georgia, Georgian Radio	11805me				
0730	0800		Switzerland, Swiss R Intl	9885af	13790af	17665af		
0730	0800	as	UK, BBC World Service	15575va				
0745	0800	as	Albania, TWR	12070eu				
0745	0800	mtwhf	Guam, TWR	15330as				
0755	0800	mtwhf	Albania, TWR	12070eu				
0755	0800	mtwhf	Monaco, TWR	9870eu				

0800 UTC - 3AM E / 2AM C / 12AM P

0800	0805	vi	Pakistan, Radio	17520as	21465as			
0800	0820	s	Monaco, TWR	9870eu				
0800	0825		Belgium, Radio Vlaanderen Intl	5985eu				
0800	0827		Czech Rep, Radio Prague Intl	11600eu	15255eu			
0800	0830	s	Armenia, Voice of	15270eu				
0800	0830		Australia, ABC NT Alice Springs	4835do				
0800	0830		Australia, ABC NT Katherine	5025do				
0800	0830		Australia, ABC NT Tennant Crk	4910do				
0800	0830		Malaysia, RTM Kota Kinabalu	5979do				
0800	0830		Malaysia, Voice of	6175as	9750as	15295as		
0800	0830		Myanmar, Radio	9730do				
0800	0845		USA, WYFR Okeechobee FL	11580af				
0800	0850	as	Albania, TWR	12070eu				
0800	0850	s	Monaco, TWR	9870eu				
0800	0900	mtwhf	Albania, TWR	12070eu				
0800	0900		Anguilla, Caribbean Beacon	6090am				
0800	0900		Australia, Radio	5995pa	7240va	9580va	9660pa	9710pa
			11880va	12080va	15420va	15415as	17715va	17750as
			21725as	21740va				
0800	0900	vi	Austria, AWR	9660af	17820va			
0800	0900	mtwhf	Bhutan, Bhutan BC Service	5030al	6035do			
0800	0900	vi	Botswana, Radio	4820do	7255do			
0800	0900		Canada, CFRX Toronto ON	6070do				
0800	0900		Canada, CFVP Calgary AB	6030do				
0800	0900		Canada, CKZN St John's NF	6160do				
0800	0900		Canada, CKZU Vancouver BC	6160do				
0800	0900		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
0800	0900		Ecuador, HCJB	5965eu	11755pa	21455usb		
0800	0900	mtwhf	Eqt Guinea, Radio Africa	15185af				
0800	0900	as/vi	Eqt. Guinea, Radio East Africa	15185af				
0800	0900		Germany, Deutsche Welle	6140eu				
0800	0900	vi	Ghana, Ghana BC Corp	3366do	4915do			
0800	0900	vi	Greece, Voice of	9420eu	15630eu			
0800	0900	mtwhf	Guam, TWR	15215as				
0800	0900	as	Guam, TWR	15330as				
0800	0900		Guyana, Voice of	3290do	5950do			
0800	0900		Indonesia, Voice of	9525va	11785al	15150al		
0800	0900		Kenya, Kenya BC Corp	4885do	4935do			
0800	0900	ireg	Liberia, ELWA	4760do				
0800	0900		Liberia, R Liberia Intl	6100do				
0800	0900		Malaysia, Radio	7295do				
0800	0900	vi/s	Malta, VO Mediterranean	9605eu				
0800	0900		New Zealand, Radio NZ Intl	11675pa				
0800	0900		Nigeria, Radio/Enugu	6025do				
0800	0900		Nigeria, Radio/Ibadan	6050do				
0800	0900		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0800	0900		Nigeria, Radio/Lagos	3326do	4990al			
0800	0900		Nigeria, Voice of	7255af				
0800	0900		Palau, KHBN/VO Hope	9965as	9985as	15725as		
0800	0900		Papua New Guinea, NBC	4890do	9675al			
0800	0900		Russia, University Network	17765as				
0800	0900		Russia, Voice of Russia	7180as	7240ou	7260as	7350va	17675as
			17685au	17795as				
0800	0900		Singapore, SBC Radio One	6150do				
0800	0900	a	South Africa, Radio League	9750af	21560af			
0800	0900		South Korea, R Korea Intl	9570va	13670va			
0800	0900		UK, BBC World Service	6190af	6195eu	9410eu	11760va	11940af
			11955as	12095va	15310as	15360as	15400af	15485va
			15575va	17640va	17760as	17830af	17885af	21470af
			21830as					21660as

0800	0900		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
0800	0900		USA, KAU Dallas TX	5755va				
0800	0900		USA, KIMF Otero NM	5835na				
0800	0900		USA, KNLS Anchor Point AK	9615as				
0800	0900		USA, KTVN Salt Lk City UT	7505na				
0800	0900		USA, KWHR Naalehu HI	11565pa	17780as			
0800	0900		USA, Voice of America	11955va	13605va	15150va		
0800	0900		USA, WEWN Birmingham AL	5825na	7425na	11875na		
0800	0900		USA, WHRI Noblesville IN	5745va	7315am			
0800	0900		USA, WJIE Louisville KY	7490am	13595am			
0800	0900		USA, WMLK Bethel PA	9465eu	9955eu			
0800	0900		USA, WRMI Miami FL	7385am				
0800	0900	as	USA, WSHB Cypress Creek SC	7535eu	9845oc			
0800	0900	tw	USA, WSHB Cypress Creek SC	9845oc				
0800	0900		USA, WTJC Newport NC	9370na				
0800	0900		USA, WWCN Nashville TN	3210na	5070na	5935na	7465na	
0800	0900	vi	Vanuatu, Radio	4960do	7260do			
0800	0900		Zambia, Christian Voice	9865af				
0830	0900		Australia, ABC NT Katherine	2485do				
0830	0900		Australia, ABC NT Tennant Crk	2325do				
0830	0900	vi	Solomon Islands, SIBC	5020do				
0830	0900		Switzerland, Swiss R Intl	21770af				
0840	0850		Turkmenistan, Turkmen Radio	5015as				

0900 UTC - 4AM E / 3AM C / 1AM P

0900	0915	mtwhf/vi	Solomon Islands, SIBC	5020do				
0900	0920	mtwhf	Albania, TWR	12070eu				
0900	0920	mtwhf	Monaco, TWR	9870eu				
0900	0930		Austria, AWR	17670af				
0900	0930	as	Guam, TWR	15330as				
0900	0930	ireg	Liberia, ELWA	4760do				
0900	0945		Germany, Deutsche Welle	15410af	17800af	17820va	6160oc	9510va
			17845va	17860af	21560af			11785af
0900	1000		Anguilla, Caribbean Beacon	6090am				
0900	1000		Australia, ABC NT Katherine	2485do				
0900	1000		Australia, ABC NT Tennant Crk	2325do				
0900	1000		Australia, Radio	17775as				
0900	1000		Australia, Radio	7240va	9580va	9660pa	11880va	12080va
			15240as	15415as	17715va	17750as	17795va	21725as
			21820as					21740va
0900	1000		Australia, Voice International	13685as				
0900	1000	vi	Botswana, Radio	4820do	7255do			
0900	1000		Canada, CFRX Toronto ON	6070do				
0900	1000		Canada, CFVP Calgary AB	6030do				
0900	1000		Canada, CKZN St John's NF	6160do				
0900	1000		Canada, CKZU Vancouver BC	6160do				
0900	1000		China, China Radio Intl	11730pa	15210pa			
0900	1000		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
0900	1000		Ecuador, HCJB	11755pa	21455usb			
0900	1000	mtwhf	Eqt Guinea, Radio Africa	15185af				
0900	1000	as/vi	Eqt. Guinea, Radio East Africa	15185af				
0900	1000		Germany, Deutsche Welle	6140eu				
0900	1000	vi	Ghana, Ghana BC Corp	4915do				
0900	1000	vi	Greece, Voice of	9420eu	15630eu			
0900	1000		Guyana, Voice of	3290do	5950do			
0900	1000	as/vi	Italy, IRRS	13840va				
0900	1000		Kenya, Kenya BC Corp	4885do	4935do			
0900	1000		Liberia, R Liberia Intl	6100do				
0900	1000		Malaysia, Radio	7295do				
0900	1000		New Zealand, Radio NZ Intl	11675pa				
0900	1000		Nigeria, Radio/Enugu	6025do				
0900	1000		Nigeria, Radio/Ibadan	6050do				
0900	1000		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
0900	1000		Nigeria, Radio/Lagos	3326do	4990al			
0900	1000		Papua New Guinea, NBC	4890do				
0900	1000		Russia, University Network	17765as				
0900	1000		Singapore, SBC Radio One	6150do				
0900	1000	as/vi	Solomon Islands, SIBC	5020do				
0900	1000		UK, BBC World Service	6190af	6195va	9605as	9740af	11760va
			11940af	12095eu	15190sa	15310as	15360as	15400af
			15565va	15575va	17640va	17760as	17830af	17790as
			21470af	21660as				17885af
0900	1000		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
0900	1000		USA, KAU Dallas TX	5755va				
0900	1000		USA, KIMF Otero NM	5835na				
0900	1000		USA, KTVN Salt Lk City UT	7505na				
0900	1000		USA, KWHR Naalehu HI	11565pa	17780as			
0900	1000		USA, Voice of America	11955va	13610va	15150va		
0900	1000		USA, WEWN Birmingham AL	5825na	7425na	11875na		

Shortwave Guide



0900	1000	USA, WHRA Greenbush ME	7580va				
0900	1000	USA, WHRI Noblesville IN	5745va	7315am			
0900	1000	USA, WJIE Louisville KY	7490am	13595am			
0900	1000	USA, WRMI Miami FL	7385am				
0900	1000	th USA, WSHB Cypress Creek SC	7535eu				
0900	1000	USA, WTJC Newport NC	9370na				
0900	1000	USA, WWCN Nashville TN	3210na	5070na	5935na	9475na	
0900	1000	vi Vanuatu, Radio	4960do	7260do			
0900	1000	Zambia, Christian Voice	9865af				
0930	1000	Georgia, Georgian Radio	11910me				
0930	1000	Lithuania, R Vilnius	9710eu				
0930	1000	Netherlands, Radio	9790va	12065va	13710as		
0945	1000	mtwhf/vl Solomon Islands, SIBC	5020do				

1000 UTC - 5AM E / 4AM C / 2AM P

1000	1027	Vietnam, Voice of	9840as	12020au			
1000	1029	Czech Rep, Radio Prague Intl		21745va			
1000	1030	Mongolia, Voice of	12085as				
1000	1030	UK, BBC World Service	9605as	15360as	21660as		
1000	1030	UK, RTE Radio	15280au				
1000	1045	USA, KWHR Naalehu HI	11565pa				
1000	1056	North Korea, Voice of	9335ca	11710ca	11735as	13650as	
1000	1100	Anguilla, Caribbean Beacon	6090am				
1000	1100	Australia, ABC NT Katherine	2485do				
1000	1100	Australia, ABC NT Tennant Crk	2325do				
1000	1100	Australia, Radio	9580va	9660pa	11880as	15240as	15415as
			17580pa	17795va	21725va	21820as	
1000	1100	Australia, Voice International	13685as				
1000	1100	as Bhutan, Bhutan BC Service	5030al	6035do			
1000	1100	vi Botsswana, Radio	4820do	7255do			
1000	1100	Canada, CFRX Toronto ON	6070do				
1000	1100	Canada, CFVP Calgary AB	6030do				
1000	1100	Canada, CKZN St John's NF	6160do				
1000	1100	Canada, CKZU Vancouver BC	6160do				
1000	1100	China, China Radio Intl	11730pa	15210pa			
1000	1100	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as		
1000	1100	Ecuador, HCJB	11755pa	21455usb			
1000	1100	mtwhf Eqt Guinea, Radio Africa	15185af				
1000	1100	as/vl Eqt. Guinea, Radio East Africa	15185af				
1000	1100	Germany, Deutsche Welle	6140eu				
1000	1100	vi Ghana, Ghana BC Corp	4915do				
1000	1100	Guyana, Voice of	3290do	5950do			
1000	1100	India, All India Radio	13615au	13695au	15020as	15260as	
			15410au	17510au	17800au		
1000	1100	as/vl Italy, IRRS	13840va				
1000	1100	Japan, Radio	9695as	15590as	21755oc		
1000	1100	Liberia, R Liberia Intl	6100do				
1000	1100	Malaysia, Radio	7295do				
1000	1100	Netherlands, Radio	9790va	12065va	13710as		
1000	1100	New Zealand, Radio NZ Intl	11675pa				
1000	1100	Nigeria, Radio/Enugu	6025do				
1000	1100	Nigeria, Radio/Ibadan	6050do				
1000	1100	Nigeria, Radio/Kaduna	4770do	6090do	9570do		
1000	1100	Nigeria, Radio/Lagos	3326do	4990al			
1000	1100	Nigeria, Voice of	7255af				
1000	1100	Palau, KHBV/VO Hope	9965as	9985as	12160as	15725as	
1000	1100	Papua New Guinea, NBC	4890do	9675al			
1000	1100	Russia, University Network	17765as				
1000	1100	Singapore, SBC Radio One	6150do				
1000	1100	vi Solomon Islands, SIBC	5020do				
1000	1100	South Africa, Radio Veritas	7240af				
1000	1100	UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu	15190sa	15310as	15485va	15565va
			17760as	17790as	17885af	21470af	
1000	1100	as UK, BBC World Service	15400af	17830af			
1000	1100	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	
1000	1100	USA, KAUJ Dallas TX	5755va				
1000	1100	USA, KIMF Otero NM	5835na				
1000	1100	USA, KTBV Salt Lk City UT		7505na			
1000	1100	USA, KWHR Naalehu HI	9930as	11565pa			
1000	1100	USA, Voice of America	5745am	5985va	7370am	9590am	11720va
			15250va	15425va	15455va		
1000	1100	USA, WEWN Birmingham AL	5825na	7425na	11875na	15745eu	
1000	1100	USA, WHRI Noblesville IN	9495va	9840am			
1000	1100	USA, WINB Red Lion PA	13570am				
1000	1100	USA, WJIE Louisville KY	7490am	13595am			
1000	1100	USA, WRMI Miami FL	9955am				
1000	1100	USA, WSHB Cypress Creek SC	6095am	11780am			
1000	1100	USA, WSHB Cypress Creek SC	11780as				
1000	1100	USA, WTJC Newport NC	9370na				
1000	1100	USA, WWCN Nashville TN	5070na	5935na	5935na	9475na	

1000	1100	USA, WYFR Okeechobee FL	5950na				
1000	1100	Vatican City, Vatican Radio	5890eu				
1000	1200	s USA, WSHB Cypress Creek SC	9455am	11780as			
1030	1045	mtwhf Ethiopia, Radio	5990do	7110do	9704do		
1030	1100	Georgia, Georgian Radio	11910me				
1030	1100	Guam, AWR	11900as				
1030	1100	Netherlands, Radio	5965na	6045eu	9860eu		
1030	1100	UAE, Emirates Radio	13675eu	15370eu	15395eu	21605eu	

1100 UTC - 6AM E / 5AM C / 3AM P

1100	1105	New Zealand, Radio NZ Intl	11675pa				
1100	1120	fa Kazakhstan, R Almaty	9620eu	11840eu			
1100	1127	Vietnam, Voice of	5995va	7145va	9730eu		
1100	1130	as Bhutan, Bhutan BC Service	5030al	6035do			
1100	1130	Netherlands, Radio	9790va	12065va	13710as		
1100	1130	UK, BBC World Service	15400af	17790as			
1100	1145	Germany, Deutsche Welle	15410af	17800af	21530af	21780af	
			25700af				
1100	1200	Anguilla, Caribbean Beacon	11775am				
1100	1200	Australia, ABC NT Katherine	2485do				
1100	1200	Australia, ABC NT Tennant Crk	2325do				
1100	1200	Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa
			11650va	11880as	12080va	15240va	15415as
			17795va	21725va	21820as	17580pa	17750as
1100	1200	Australia, Voice International	13685as				
1100	1200	Canada, CFRX Toronto ON	6070do				
1100	1200	Canada, CFVP Calgary AB	6030do				
1100	1200	Canada, CKZN St John's NF	6160do				
1100	1200	Canada, CKZU Vancouver BC	6160do				
1100	1200	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as		
1100	1200	Ecuador, HCJB	12005am	15115am	21455usb		
1100	1200	mtwhf Eqt Guinea, Radio Africa	15185af				
1100	1200	as/vl Eqt. Guinea, Radio East Africa	15185af				
1100	1200	Germany, Deutsche Welle	6140eu				
1100	1200	vi Ghana, Ghana BC Corp	4915do				
1100	1200	Guyana, Voice of	3290do	5950do			
1100	1200	Iran, VOIR	15375as	15385as	15480as	21470as	21730as
1100	1200	as/vl Italy, IRRS	13840va				
1100	1200	Japan, Radio	6120na	9695as	15590as		
1100	1200	Jordan, Radio	11690eu				
1100	1200	Malaysia, Radio	7295do				
1100	1200	Netherlands, Radio	5965na	6045eu	9860eu		
1100	1200	Palau, KHBV/VO Hope	9965as	9985as	12160as	13840as	
1100	1200	Papua New Guinea, NBC	4890do	9675al			
1100	1200	Russia, University Network	17765as				
1100	1200	Singapore, R Singapore Intl	6150as	9600as			
1100	1200	Taiwan, R Taipei Intl	7445as	11985as			
1100	1200	UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu	15190sa	15310as	15485va	15575va
			17760as	17790as	17830af	17885af	21470af
1100	1200	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb	10320usb	10940usb	12579usb	
1100	1200	USA, KAUJ Dallas TX	5755va				
1100	1200	USA, KIMF Otero NM	5835na				
1100	1200	USA, KTBV Salt Lk City UT		7505na			
1100	1200	USA, KWHR Naalehu HI	9930as	11565pa			
1100	1200	USA, Voice of America	5985va	6110va	9760va	11705va	11720va
			15250va	15425va	15455va		
1100	1200	USA, WEWN Birmingham AL	5825na	7425na	11875na	15745eu	
1100	1200	USA, WHRI Noblesville IN	9495va	9840am			
1100	1200	USA, WINB Red Lion PA	13570am				
1100	1200	USA, WJIE Louisville KY	7490am	13595am			
1100	1200	USA, WRMI Miami FL	9955am				
1100	1200	USA, WSHB Cypress Creek SC	6095am	11780am			
1100	1200	USA, WSHB Cypress Creek SC	11780as				
1100	1200	USA, WTJC Newport NC	9370na				
1100	1200	USA, WWCN Nashville TN	5070na	5935na	5935na	9475na	
			15685na				
1100	1200	USA, WYFR Okeechobee FL	5950na	11725sa	11830sa		
1106	1200	New Zealand, Radio NZ Intl	15175pa				
1115	1130	Israel, Kol Israel	15640va	17545va			
1115	1145	Nepal, Radio	3230as	5005as	6100as		
1120	1140	Kazakhstan, R Almaty	9620eu	11840eu			
1130	1145	vi Libya, Voice of Africa	15435irr	17750irr			
1130	1155	Belgium, Radio Vlaanderen Intl	7390as				
1130	1157	Czech Rep, Radio Prague Intl	11640va	21745va			
1130	1200	Austria, Radio Austria Intl	6155eu	13730eu	21780as		
1130	1200	South Korea, R Korea Intl	9650na				
1130	1200	a UK, Wales Radio Intl	17625pa				
1130	1200	f Vatican City, Vatican Radio	5595va	17515va			
1140	1200	t Kazakhstan, R Almaty	9620eu	11840eu			
1155	1200	vi Zimbabwe, ZBC Corp	5975do				

Shortwave Guide

MT

1200 UTC - 7AM E / 6AM C / 4AM P

1200	1225	Netherlands, Radio	5965na	6045eu	9860eu		
1200	1227	Iran, VOIRI	15375as	15385as	15480as	21470as	21730as
1200	1230	France Radio France Intl	15540af	25820af			
1200	1230	Uzbekistan, Radio Tashkent		7285as	9715as	15295as	17775as
1200	1230	vi Zimbabwe, ZBC Corp	5975do				
1200	1245	USA, WYFR Okeechobee FL		5950na			
1200	1259	Canada, Radio Canada Intl		9660as	11730as		
1200	1300	Anguilla, Caribbean Beacon		11775am			
1200	1300	Australia, ABC NT Katherine		2485do			
1200	1300	Australia, ABC NT Tennant Crk		2325do			
1200	1300	Australia, Radio	5995pa	6020pa	9475as	9580va	9660pa
			11650va	11880as	12080va	15415as	15240pa
							17580pa
							21725va
1200	1300	Australia, Voice International		13685as			
1200	1300	Bangladesh, Bangla Betar		7185as	9550as		
1200	1300	Canada, CBC Northern Service		9625do			
1200	1300	Canada, CFRX Toronto ON		6070do			
1200	1300	Canada, CFVP Calgary AB		6030do			
1200	1300	Canada, CKZN St John's NF		6160do			
1200	1300	Canada, CKZU Vancouver BC		6160do			
1200	1300	China, China Radio Intl 9730as		9760as	11760pa	11980pa	
1200	1300	Costa Rica, University Network		5030am	6150am	7375am	9725sa
1200	1300	Ecuador, HCJB	12005am	15115am	21455usb		
1200	1300	Germany, Deutsche Welle		6140eu			
1200	1300	Germany, Overcomer Ministries		5975eu			
1200	1300	Guyana, Voice of	3290do	5950do			
1200	1300	as/vl Italy, IRRS	13840va				
1200	1300	Jordan, Radio	11690eu				
1200	1300	Malaysia, Radio	7295do				
1200	1300	New Zealand, Radio NZ Intl		15175pa			
1200	1300	Palau, KHBV/VO Hope	9965as	9985as	12160as	13840as	
1200	1300	Papua New Guinea, NBC		4890do	9675al		
1200	1300	Russia, University Network		17765as			
1200	1300	Russia, Voice of Hope	13590as				
1200	1300	Singapore, R Singapore Intl		6150as	9600as		
1200	1300	Taiwan, R Taipei Intl	7130as	9610au			
1200	1300	UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu	15190va	15310as	15485va	15565va
			17760as	17790as	17885af	21470af	17640va
1200	1300	Ukraine, R Ukraine Intl	11825na	11840na	13590na	17760na	
1200	1300	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
				6458usb	10320usb	10940usb	
1200	1300	USA, KAUJ Dallas TX	5755va				
1200	1300	USA, KIMF Otero NM	5835na				
1200	1300	USA, KTBV Salt Lk City UT		7505na			
1200	1300	USA, KWHR Naalehu HI	9930as	11565pa			
1200	1300	USA, Voice of America	6110va	9645va	9760va	11705va	11715va
			15250va	15425va	15455va		
1200	1300	USA, WEWN Birmingham AL		5825na	7425na	11875na	15745eu
1200	1300	USA, WHRI Noblesville IN		9495na	9840am		
1200	1300	USA, WINB Red Lion PA	13570am				
1200	1300	USA, WJIE Louisville KY	7490am	13595am			
1200	1300	USA, WRMI Miami FL	9955am				
1200	1300	USA, WSHB Cypress Creek SC		6095am	9880as		
1200	1300	USA, WSHB Cypress Creek SC		9455am	9880as		
1200	1300	USA, WSHB Cypress Creek SC		9880as			
1200	1300	USA, WTJC Newport NC	9370na				
1200	1300	USA, WWCR Nashville TN		5070na	5935na	5935na	7465na
1200	1300	USA, WYFR Okeechobee FL		11970na	13695na		
1215	1300	Egypt, Radio Cairo	17775as				
1225	1300	Sri Lanka, SLBC	6005as	9700as	15745as		
1230	1257	Vietnam, Voice of	9840as	12020as			
1230	1300	Australia, Radio	17750as				
1230	1300	Bulgaria, Radio	12000eu	15700eu			
1230	1300	Sweden, Radio	17505va	18960na			
1230	1300	Thailand, Radio	9810va				
1230	1300	UAE, Gospel For Asia	15170as				
1245	1300	tfa Seychelles, FEBA Radio	15535me				

1300 UTC - 8AM E / 7AM C / 5AM P

1300	1305	New Zealand, Radio NZ Intl	15175pa				
1300	1310	mtwhfa Turkmenistan, Turkmen Radio	5015as				
1300	1330	Australia, Radio	11880as				
1300	1330	vi UAE, AWR	17870as				
1300	1330	UAE, Gospel For Asia	15170as				
1300	1345	USA, WYFR Okeechobee FL	11970na				

1300	1356	North Korea, Voice of	9335eu	11710na	13760eu	15244eu	
1300	1400	Anguilla, Caribbean Beacon		11775am			
1300	1400	Australia, ABC NT Katherine		2485do			
1300	1400	Australia, ABC NT Tennant Crk		2325do			
1300	1400	Australia, Radio	5995pa	6020pa	9580va	9660pa	11650va
			12080va	15240pa	15415as	17580pa	21725va
							21820as
1300	1400	Australia, Voice International		13690as			
1300	1400	Canada, CBC Northern Service		9625do			
1300	1400	Canada, CFRX Toronto ON		6070do			
1300	1400	Canada, CFVP Calgary AB		6030do			
1300	1400	Canada, CKZN St John's NF		6160do			
1300	1400	Canada, CKZU Vancouver BC		6160do			
1300	1400	Canada, Radio Canada Intl		9515am	13655am	17710am	
1300	1400	China, China Radio Intl 7405na		9570pa	11760pa	11900as	11980as
1300	1400	Costa Rica, University Network		5030am	6150am	7375am	9725sa
1300	1400	Ecuador, HCJB	12005am	15115am	21455usb		
1300	1400	Germany, Deutsche Welle		6140eu			
1300	1400	Germany, Overcomer Ministries		13810me			
1300	1400	as/vl Italy, IRRS	13840va				
1300	1400	Jordan, Radio	11690eu				
1300	1400	Malaysia, Radio	7295do				
1300	1400	Palau, KHBV/VO Hope	9965as	9985as	12160as	13840as	
1300	1400	Papua New Guinea, NBC		4890do	9675al		
1300	1400	Poland, Radio Polonia	6095eu	9525eu	11820eu		
1300	1400	Russia, University Network		17765as			
1300	1400	Singapore, R Singapore Intl		6150as	9600as		
1300	1400	South Africa, Channel Africa		11720af	17725af	21760af	
1300	1400	South Korea, R Korea Intl		9570as	13670as		
1300	1400	Sri Lanka, SLBC	6005as	9700as	15745as		
1300	1400	UK, BBC World Service	6190af	6195va	9740as	11760va	11940af
			12095eu	15190va	15310as	15420af	15485va
			17640va	17760as	17790as	17885af	21470af
1300	1400	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb
				6458usb	10320usb	10940usb	
1300	1400	USA, KAUJ Dallas TX	5755va				
1300	1400	USA, KIMF Otero NM	5835na				
1300	1400	USA, KNLS Anchor Point AK		11765as			
1300	1400	USA, KTBV Salt Lk City UT		7505na			
1300	1400	USA, KWHR Naalehu HI	9930as	11565pa			
1300	1400	USA, Voice of America	6160va	9645va	9760va	11705va	15425va
1300	1400	USA, WBCQ Kennebunk, ME		7415na			
1300	1400	USA, WBCQ Kennebunk, ME		7415na			
1300	1400	USA, WEWN Birmingham AL		9355na	9955na	15375na	15745eu
1300	1400	USA, WHRA Greenbush ME		17560va			
1300	1400	USA, WHRI Noblesville IN		9840am	15105va		
1300	1400	USA, WINB Red Lion PA	13570am				
1300	1400	USA, WJIE Louisville KY	7490am	13595am			
1300	1400	USA, WRMI Miami FL	9955am				
1300	1400	USA, WSHB Cypress Creek SC		9430na	7460as		
1300	1400	USA, WSHB Cypress Creek SC		9455am	7460as		
1300	1400	USA, WSHB Cypress Creek SC		7460as			
1300	1400	USA, WTJC Newport NC	9370na				
1300	1400	USA, WWCR Nashville TN		7465na	12160na	13845na	
1300	1400	USA, WYFR Okeechobee FL		11740na	11830na	11550as	17510sa
1300	1400	Russia, Voice of	6145as	6185as	7105au	7155au	7365au
			9450au	9490as	15460au	15510au	
1306	1400cc	New Zealand, Radio NZ Intl		6095pa			
1330	1350	UAE, Emirates Radio	13630eu	13675eu	15400eu	21597eu	
1330	1357	Vietnam, Voice of	7145eu	9730eu			
1330	1400	Australia, Radio	11660as	17750as			
1330	1400	Austria, Radio Austria Intl		6155eu	13730eu		
1330	1400	Germany, Voice of Hope	17550as				
1330	1400	Guam, AWR	11755as	15660as			
1330	1400	India, All India Radio	9690as	11620as	13710as		
1330	1400	Laos, Lao National Radio		7145as			
1330	1400	Sweden, Radio	9430va	18960na			
1330	1400	Turkey, Voice of	17690va	17815eu			
1330	1400	vi UAE, AWR	15385as				
1330	1400	Uzbekistan, Radio Tashkent		7285as	9715as	15295as	17775as
1330	1400	mtwhf Yugoslavia, R Yugoslavia		11835au			

1400 UTC - 9AM E / 8AM C / 6AM P

1400	1420	Turkey, Voice of	17690va	17815va			
1400	1429	Czech Rep, Radio Prague Intl		21745va			
1400	1430	Ecuador, HCJB	12005am	15115am	21455usb		
1400	1430	Germany, Voice of Hope	17550as				
1400	1430	Thailand, Radio	9530va				

MT

1600 UTC - 11AM E / 10AM C / 8AM P

1500	1530		Mexico, Radio Mexico Intl	9705am	11770am		
1500	1530		Mongolia, Voice of	12015eu			
1500	1530		South Africa, Channel Africa	17725af			
1500	1530		Sri Lanka, SLBC	6005as	9700as	15745as	
1500	1530	as	UK, BBC World Service	11860af	21490af		
1500	1545		Guam, TWR 15330as				
1500	1556		North Korea, Voice of	9335na	11710na	13760eu	15245eu
1500	1557		Canada, Radio Canada Intl	15360as	17870as		
1500	1559	mtwhf	Canada, Radio Canada Intl	9515am	13655am	17710am	
1500	1600		Anguilla, Caribbean Beacon	11775am			
1500	1600		Australia, Radio	9475as	9580va	9660pa	11650va 11660os
			12080va 15240pa 15415as	15515va	17580pa	17750as	21725va
1500	1600		Australia, Voice International	13690as			
1500	1600		Austria, Radio Afrika Intl	17895eu			

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Shortwave Guide



1600	1700	France Radio France Intl	11615af	11995af	12015af	15605af	17850af
1600	1700	Germany, Deutsche Welle	6140eu	6170as	7225as	9735af	
1600	1700	Germany, Overcomer Ministries	6015eu				
1600	1700	Greece, Voice of	15725va				
1600	1700	Guam, AWR	11560me	15495me	17630me		
1600	1700	Jordan, Radio	11690na				
1600	1700	Palau, KHBV/VO Hope	9965as				
1600	1700	Russia, Voice of Russia	7350as	11985as	11985me	12055me	
		15540me					
1600	1700	South Africa, Radio Veritas	3230af				
1600	1700	South Korea, R Korea Intl	5975va	9515va	9870va		
1600	1700	Taiwan, R Taipei Intl	11550as				
1600	1700	UK, BBC World Service	3915as	5975as	6190af	6195va	7160as
		9410va	9510as	9740as	12095va	15190am	15310as
		15400af	15565va	17640me	17790as	17830af	21470af
					21660af		
1600	1700	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1600	1700	USA, KAU Dallas TX	13815va				
1600	1700	USA, KIMF Otero NM	5835na				
1600	1700	USA, KJES Vado NM	11715na				
1600	1700	USA, KTBN Salt Lk City UT	15590na				
1600	1700	USA, Voice of America	6035af	6110va	7125va	9575va	9645va
		13600va	13710af	15395va	15420af	15485af	15445va
		17715af	17895af	17640va			
1600	1700	USA, WBCQ Kennebunk, ME	7415na	17495na			
1600	1700	USA, WEWN Birmingham AL	11530na	13615na	15375na	15745eu	
1600	1700	USA, WHRA Greenbush ME	17650va				
1600	1700	USA, WHRI Noblesville IN	13760na	15105va			
1600	1700	USA, WINB Red Lion PA	13570am				
1600	1700	USA, WJIE Louisville KY	7490am	13595am			
1600	1700	USA, WMLK Bethel PA	9465eu				
1600	1700	USA, WRMI Miami FL	15725am				
1600	1700	USA, WRNO New Orleans LA	7395am				
1600	1700	USA, WSHB Cypress Creek SC	18910af				
1600	1700	USA, WTJC Newport NC	9370na				
1600	1700	USA, WWCR Nashville TN	9475na	12160na	13845na		
		15685na					
1600	1700	USA, WWRB Manchester TN	9320va	12170va			
1600	1700	USA, WYFR Okeechobee FL	6280as	11830na	17760na	18980eu	
		21455eu					
1630	1657	Vietnam, Voice of	7145eu	9730eu			
1630	1700	Australia, Radio	17750as				
1630	1700	Australia, Voice International	11685as				
1630	1700	Austria, AWR	9850af				
1630	1700	UAE, AWR	9890as				
1630	1700	UK, BBC World Service	15420af	21490af			
1645	1700	Tajikistan, Radio	4760as	7245af			
1650	1700	New Zealand, Radio NZ Intl	11980pa				

1700 UTC - 12PM E / 11AM C / 9AM P

1700	1727	Czech Rep, Radio Prague Intl	5930va	17485va			
1700	1730	Azerbaijan, Voice of	6110eu				
1700	1730	France Radio France Intl	11615af	12015af	15605af	17850af	
1700	1730	South Africa, Channel Africa	17870af				
1700	1730	UK, BBC World Service	6005af	9630af			
1700	1730	Vatican City, Vatican Radio	5890as	7250as	9645as	15595as	
1700	1750	New Zealand, Radio NZ Intl	11980pa				
1700	1800	Anguilla, Caribbean Beacon	11775am				
1700	1800	Australia, Radio	9475as	9580pa	9660pa	9815pa	11880va
		12080va	15240pa	15515va	17580pa	21725pa	21820as
1700	1800	Australia, Voice International	11685as				
1700	1800	Canada, CBC Northern Service	9625do				
1700	1800	Canada, CFRX Toronto ON	6070do				
1700	1800	Canada, CFVP Calgary AB	6030do				
1700	1800	Canada, CKZN St John's NF	6160do				
1700	1800	Canada, CKZU Vancouver BC	6160do				
1700	1800	China, China Radio Intl	9695af	9870af	11920as	15205af	
1700	1800	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as			
1700	1800	Eqt Guinea, Radio Africa	15185af				
1700	1800	Germany, Deutsche Welle	6140eu				
1700	1800	Germany, Overcomer Ministries	6015eu				
1700	1800	Germany, United Methodist Ch	13820va	15485va			
1700	1800	Germany, Voice of Hope	9495eu				
1700	1800	Japan, Radio	9505na	11970na	15355af		
1700	1800	Romania, R Romania Intl	11740eu	15365eu	15380eu	17805eu	
1700	1800	Russia, Voice of Russia	7350as	11985as	12055me		
		15540me					
1700	1800	South Africa, Radio Veritas	3230af				
1700	1800	Taiwan, R Taipei Intl	11550as				
1700	1800	UK, BBC World Service	3255af	3915as	5975as	6190af	6195va
		7160as	9410va	9510as	12095va	15310as	15400af
		15565va	17640me	17830af	21470af		

1700	1800	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb
1700	1800	USA, KAU Dallas TX	13815va				
1700	1800	USA, KIMF Otero NM	5835na				
1700	1800	USA, KTBN Salt Lk City UT	15590na				
1700	1800	USA, Voice of America	6040va	6110va	7125va	9645va	9760va
		13710af	15205va	15395va	15240af	15445af	17895af
1700	1800	USA, Voice of America	5990va	6045va	9525va	9795va	11955va
		12005va	15255va				
1700	1800	USA, WBCQ Kennebunk, ME	7415na	17495na			
1700	1800	USA, WEWN Birmingham AL	11530na	13615na	15375na		
1700	1800	USA, WHRA Greenbush ME	17650va				
1700	1800	USA, WHRI Noblesville IN	13760na	15105va			
1700	1800	USA, WINB Red Lion PA	13570am				
1700	1800	USA, WJIE Louisville KY	7490am	13595am			
1700	1800	USA, WMLK Bethel PA	9465eu	15265eu			
1700	1800	USA, WRMI Miami FL	15725am				
1700	1800	USA, WRNO New Orleans LA	7395am				
1700	1800	USA, WSHB Cypress Creek SC	15190af				
1700	1800	USA, WTJC Newport NC	9370na				
1700	1800	USA, WWCR Nashville TN	9475na	12160na	13845na		
		15685na					
1700	1800	USA, WWRB Manchester TN	9320va	12170va			
1700	1800	USA, WYFR Okeechobee FL	18980eu	21455eu			
1715	1730	UK, BBC World Service	15390am				
1725	1745	UK, United Nations Radio	7170af	15495af	17580eu		
1730	1745	Israel, Kol Israel	11605va	17545va			
1730	1745	Libya, Voice of Africa	15435irr	17750irr			
1730	1745	UK, BBC World Service	3390va	7230va	9525va		
1730	1800	Australia, Radio	17750as				
1730	1800	Georgia, Georgian Radio	6180me				
1730	1800	Guam, AWR	9385as				
1730	1800	Liberia, ELWA	4760do				
1730	1800	Malta, VO Mediterranean	9605eu				
1730	1800	Netherlands, Radio	6020af	7120af	11655af		
1730	1800	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu		
1730	1800	Swaziland, TWR	9500af				
1730	1800	Switzerland, Swiss R Intl	9755va	13790af	15555va		
1730	1800	Vatican City, Vatican Radio	13765af	15570af	17515af		
1735	1745	Paraguay, Radio Nacional	9739sa				
1745	1800	Bangladesh, Bangla Betar	7185eu	9550eu	15520eu		
1745	1800	India, All India Radio	7410eu	9950eu	11620af	11935af	13605af
		15155af	17670af				
1751	1800	New Zealand, Radio NZ Intl	15265pa				

1800 UTC - 1PM E / 12PM C / 10AM P

1800	1827	Czech Rep, Radio Prague Intl	5930va	7315va			
1800	1827	Vietnam, Voice of	5955eu	7145eu	9730eu		
1800	1830	Germany, Deutsche Welle	3995au				
1800	1830	Germany, Universal Life	15750af				
1800	1830	South Africa, AWR	5970af	6095af	7170af		
1800	1830	South Africa, Channel Africa	17870af				
1800	1830	UK, BBC World Service	5975as	9510as			
1800	1830	UK, RTE Radio	9895me				
1800	1830	Zimbabwe, ZBC Corp	4828do				
1800	1900	Anguilla, Caribbean Beacon	11775am				
1800	1900	Australia, Radio	5995pa	6080pa	7240va	9475as	9580va
		9710pa	9815pa	11880va	12080va	15515va	17750as
		21725pa	21820as				
1800	1900	Australia, Voice International	11685as				
1800	1900	Bangladesh, Bangla Betar	7185eu	9550eu	15520eu		
1800	1900	Canada, CBC Northern Service	9625do				
1800	1900	Canada, CFRX Toronto ON	6070do				
1800	1900	Canada, CFVP Calgary AB	6030do				
1800	1900	Canada, CKZN St John's NF	6160do				
1800	1900	Canada, CKZU Vancouver BC	6160do				
1800	1900	Costa Rica, University Network	5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as			
1800	1900	Eqt Guinea, Radio Africa	15185af				
1800	1900	Germany, Deutsche Welle	6140eu				
1800	1900	Germany, United Methodist Ch	13820va	15485va			
1800	1900	India, All India Radio	7410eu	9950eu	11620af	11935af	13605af
		15155af	17670af				
1800	1900	Kuwait, Radio	11990va				
1800	1900	Liberia, ELWA	4760do				
1800	1900	Liberia, R Liberia Intl	5100do				
1800	1900	Netherlands, Radio	6020af	7120af	11655af		
1800	1900	New Zealand, Radio NZ Intl	15265pa				
1800	1900	Poland, Radio Polonia	5995eu				
1800	1900	Russia, Voice of Russia	7300eu	7310eu	7360eu	9480eu	9745eu
		9775af	9820eu	11870eu			
1800	1900	South Africa, Radio League	3215af				
1800	1900	South Africa, Radio Veritas	3230af				

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1800	1900	Swaziland, TWR	9500af					
1800	1900	Taiwan, R Taipei Intl	3955eu					
1800	1900	UK, BBC World Service	3255af	6190af	6195va	9410va		
		12095me	15310va	15400af	15420af	15565me	17830af	21470af
1800	1900	USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb		
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
1800	1900	USA, KALJ Dallas TX	13815va					
1800	1900	USA, KIMF Otero NM	11885na					
1800	1900	USA, KTBN Salt Lk City UT		15590na				
1800	1900	USA, Voice of America	6035af	6040va	9760va	9885va	11975af	
		13710af	15240af	15580af				
1800	1900	USA, WBCQ Kennebunk, ME	7415na	17495na				
1800	1900	USA, WEWN Birmingham AL	11530na	13615na	15745na			
1800	1900	USA, WHRA Greenbush ME	17650va					
1800	1900	USA, WHRI Noblesville IN	9495va	13760na				
1800	1900	USA, WINB Red Lion PA	13570am					
1800	1900	USA, WJIE Louisville KY	7490am	13595am				
1800	1900	USA, WMLK Bethel PA	9465eu	15265eu				
1800	1900	USA, WRMI Miami FL	15725am					
1800	1900	USA, WRNO New Orleans LA		7395am				
1800	1900	USA, WSHB Cypress Creek SC		18910af				
1800	1900	USA, WTJC Newport NC	9370na					
1800	1900	USA, WWCN Nashville TN		9475na	12160na	13845na		
		15685na						
1800	1900	USA, WWRB Manchester TN		9320va	12170va			
1800	1900	USA, WYFR Okeechobee FL		18980eu				
1800	1900	Yemen, Rep of Yemen Radio		9780me				
1830	1855	Belgium, Radio Vlaanderen Intl	7465as	13650eu	13685eu			
1830	1900	Austria, Radio Austria Intl	5945eu	6155eu				
1830	1900	Bulgaria, Radio	5800eu	7500eu				
1830	1900	South Africa, AWR	7170af					
1830	1900	Sweden, Radio	5840va					
1830	1900	Sweden, Radio	6065va					
1830	1900	s UK, BBC World Service	6005af	9630af				
1830	1900	UK, RTE Radio	13640na	21630af				
1830	1900	vi/mtwhf UK, United Nations Radio		9850me	13775af			

1900 UTC - 2PM E / 1PM C / 11AM P

1900	1927	Vietnam, Voice of	7145eu	9730eu				
1900	1930	Germany, Deutsche Welle	3995eu					
1900	1945	Germany, Deutsche Welle	11765af	13780af	15275af	17560af		
		17810af	21780af					
1900	1945	India, All India Radio	7410eu	9950eu	11620af	11935af	13605af	
		15155af	17670af					
1900	1945	USA, WYFR Okeechobee FL		15115eu	18930eu			
1900	1945	vi Zimbabwe, ZBC Corp	4828do	5012do				
1900	1956	North Korea, Voice of	13760eu	15245as				
1900	2000	Anguilla, Caribbean Beacon		11775am				
1900	2000	mtwhf Argentina, RAE	9690eu	15345eu				
1900	2000	Australia, Radio	6080pa	7240va	9475as	9500as	9580va	
		9815pa	11880va	15240va	21820as			
1900	2000	vi Botswana, Radio	3356do	4820do	7255do			
1900	2000	Canada, CBC Northern Service		9625do				
1900	2000	Canada, CFRX Toronto ON		6070do				
1900	2000	Canada, CFVP Calgary AB		6030do				
1900	2000	Canada, CKZN St John's NF		6160do				
1900	2000	Canada, CKZU Vancouver BC		6160do				
1900	2000	China, China Radio Intl	9440af	13790af				
1900	2000	Costa Rica, University Network		5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as				
1900	2000	mtwhf Eqt Guinea, Radio Africa		15185af				
1900	2000	Germany, Voice of Hope	15715me					
1900	2000	vi Ghana, Ghana BC Corp		3366do	4915do			
1900	2000	Greece, Voice of	7425va					
1900	2000	Guyana, Voice of	3290do	5950do				
1900	2000	Iraq, Radio Iraq Intl	9887irr	11787eu				
1900	2000	Kenya, Kenya BC Corp	4885do	4935do				
1900	2000	Kuwait, Radio	11990va					
1900	2000	ireg Liberia, ELWA	4760do					
1900	2000	Liberia, R Liberia Intl	5100do					
1900	2000	Malaysia, Radio	7295do					
1900	2000	smtwha Malta, VO Mediterranean		12060eu				
1900	2000	Namibia, NBC	3270af	3290af				
1900	2000	Netherlands, Radio	6020af	7120af	11655af			
1900	2000	New Zealand, Radio NZ Intl		15265pa				
1900	2000	Nigeria, Radio/Enugu	6025do					
1900	2000	Nigeria, Radio/Ibadan	6050do					
1900	2000	Nigeria, Radio/Kaduna	4770do	6090do	9570do			
1900	2000	Nigeria, Radio/Lagos	3326do	4990af				
1900	2000	Nigeria, Voice of	7255af					
1900	2000	mtwhfa Papua New Guinea, NBC		4890do	9675al			
1900	2000	Russia, Voice of Russia	7300eu	7310eu	7360eu	9480eu	9745eu	

1900	2000	9775af	9820eu	11870eu				
1900	2000	South Korea, R Korea Intl		5975va	7275va			
1900	2000	Thailand, Radio	9535eu					
1900	2000	Uganda, Radio	4976do	5026al	7195al			
1900	2000	UK, BBC World Service	3255af	6005af	6190af	6195va	9410va	
		9630af	12095af	15310va	15400af	17830af		
1900	2000	USA, Armed Forces Network		4319usb	4993usb	5765usb	6350usb	
		6458usb	10320usb	10940usb	12579usb	12689usb	13362usb	
1900	2000	USA, KALJ Dallas TX		13815va				
1900	2000	USA, KIMF Otero NM		11885na				
1900	2000	USA, KJES Vado NM		15385au				
1900	2000	USA, KTBN Salt Lk City UT			15590na			
1900	2000	USA, Voice of America	4950af	6035af	7415af	9525va	9690va	
		9760va	9785va	11870va	11975af	12015va	13640va	13710af
		15240af	15180va	15580af	17895af			
1900	2000	USA, Voice of America	5965va	9840va	11720va	11970va	15205va	
		15410va						
1900	2000	USA, WBCQ Kennebunk, ME		7415na	17495na			
1900	2000	USA, WEWN Birmingham AL		11530na	13615na	15745na		
1900	2000	USA, WHRA Greenbush ME		17650va				
1900	2000	USA, WHRI Noblesville IN		9495va	13760na			
1900	2000	USA, WINB Red Lion PA		13570am				
1900	2000	USA, WJIE Louisville KY		7490am	13595am			
1900	2000	USA, WMLK Bethel PA		9495eu	15265eu			
1900	2000	USA, WRMI Miami FL		15725am				
1900	2000	USA, WRNO New Orleans LA		7395am				
1900	2000	th USA, WSHB Cypress Creek SC		18910af				
1900	2000	mwfa USA, WSHB Cypress Creek SC		18910af				
1900	2000	USA, WTJC Newport NC		9370na				
1900	2000	USA, WWCN Nashville TN		9475na	12160na	13845na		
		15685na						
1900	2000	USA, WWRB Manchester TN		9320va	12170va			
1900	2000	USA, WYFR Okeechobee FL		3230af				
1900	2000	vi Vanuatu, Radio	4960do	7260do				
1900	2000	Zambia, Christian Voice	4965af					
1900	2000	vi Zambia, Radio ZNBC	4910do	6265al				
1930	2000	t h Belarus, Radio Belarus Intl		7105eu	7210eu			
1930	2000	Georgia, Georgian Radio		11760eu				
1930	2000	Iran, VOIRI	6110eu	7215eu	11695af	15140eu		
1930	2000	Slovakia, R Slovakia Intl	5915eu	6055eu	7345eu			
1930	2000	mtwhf/vl Solomon Islands, SIBC	5020do					
1930	2000	Switzerland, Swiss R Intl	9755va	13660va	15485va	17660va		
1930	2000	Turkey, Voice of	9890eu					
1930	2000	Yugoslavia, R Yugoslavia		6100eu				
1935	1955	Italy, RAI Intl	5970eu	9745eu				
1940	2000	mtwhfa Armenia, Voice of	4810eu	9960eu				
1945	2000	mtwhfa Albania, Radio Tirana Intl		7210na	9520na			

2000 UTC - 3PM E / 2PM C / 12PM P

2000	2010	Vatican City, Vatican Radio	7365af	9660af	11625af			
2000	2015	s/vl Solomon Islands, SIBC	5020do					
2000	2020	Turkey, Voice of	9890eu					
2000	2025	Israel, Kol Israel	6280va	7520va	9435af	11605va	13720va	
		15640va						
2000	2025	Netherlands, Radio	6020af	7120af	11655af			
2000	2027	Iran, VOIRI	6110eu	7215eu	11695af	15140eu		
2000	2028	Hungary, Radio Budapest		6025eu	7135eu			
2000	2030	Mongolia, Voice of	12015eu					
2000	2030	mtwhf/vl Solomon Islands, SIBC	5020do					
2000	2030	Switzerland, Swiss R Intl	9755va	13660va	15485va	17660va		
2000	2045	Germany, Deutsche Welle		6180eu				
2000	2050	New Zealand, Radio NZ Intl		15265pa				
2000	2100	Algeria, Radio Algiers Intl		11715eu	15160eu			
2000	2100	Anguilla, Caribbean Beacon		11775am				
2000	2100	Australia, ABC NT Katherine		2485do				
2000	2100	Australia, ABC NT Tennant Crk		2325do				
2000	2100	Australia, Radio	7240va	9475as	9500as	9580va	9815pa	
		11880va	12080va	15240va	21820as			
2000	2100	vi Botswana, Radio	3356do	4820do	7255do			
2000	2100	Canada, CBC Northern Service		9625do				
2000	2100	Canada, CFRX Toronto ON		6070do				
2000	2100	Canada, CFVP Calgary AB		6030do				
2000	2100	Canada, CKZN St John's NF		6160do				
2000	2100	Canada, CKZU Vancouver BC		6160do				
2000	2100	China, China Radio Intl	9440eu	11640eu	11790eu	13630af	15110af	
2000	2100	Costa Rica, University Network		5030am	6150am	7375am	9725sa	
		11870am	13750na	17645as				
2000	2100	Ecuador, HCJB	11895eu					
2000	2100	mtwhf Eqt Guinea, Radio Africa		15185af				
2000	2100	Germany, Voice of Hope	6175eu	15715me				

Shortwave Guide



2000	2100	vi	Ghana, Ghana BC Corp	3366do	4915do			
2000	2100		Guam, AWR	7160as	11700as			
2000	2100		Indonesia, Voice of	9525eu	11785al	15150al		
2000	2100		Kenya, Kenya BC Corp	4885do	4935do			
2000	2100		Kuwait, Radio	11990va				
2000	2100	ireg	Liberia, ELWA	4760do				
2000	2100		Liberia, R Liberia Intl	5100do				
2000	2100		Malaysia, Radio	7295do				
2000	2100		Namibia, NBC	3270af	3290af			
2000	2100		Nigeria, Radio/Enugu	6025do				
2000	2100		Nigeria, Radio/Ibadan	6050do				
2000	2100		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2000	2100		Nigeria, Radio/Lagos	3326do	4990al			
2000	2100		Nigeria, Voice of	7255af				
2000	2100		Russia, Voice of Russia	7330eu	7310eu	7360eu	9480eu	9745eu
			9775af 9820eu	11870eu				
2000	2100		Slovakia, AWR	5955as				
2000	2100		South Africa, AWR	9745af				
2000	2100	mtwhf	Spain, R Exterior Espana	9665af	17550af			
2000	2100		Uganda, Radio	4976do	5026al	7195al		
2000	2100		UK, BBC World Service	3255af	6005af	6190af	6195va	9410va
			9630af 12095af	15400af	17830af			
2000	2100		USA, Armed Forces Network	4319usb	4993usb	5765usb	6350usb	
			6458usb 10320usb	10940usb	12579usb	12689usb	13362usb	
2000	2100		USA, KAU Dallas TX	13815va				
2000	2100		USA, KIMF Otero NM	11885na				
2000	2100		USA, KJES Vado NM	15385na				
2000	2100		USA, KTBN Salt Lk City UT		15590na			
2000	2100		USA, Voice of America	6035af	6095va	7415af	9690va	9760va
			11855af 11975af	13710af	15240af	15580af	17885af	17895af
2000	2100	as	USA, Voice of America	4950af				
2000	2100		USA, WBCQ Kennebunk, ME	7415na	17495na			
2000	2100		USA, WEWN Birmingham AL	11530na	13615na	15745na	17595eu	
2000	2100		USA, WHRA Greenbush ME	17650va				
2000	2100		USA, WHRI Noblesville IN	5745va	9495va			
2000	2100		USA, WINB Red Lion PA	13570am				
2000	2100		USA, WJIE Louisville KY	7490am	13595am			
2000	2100		USA, WMLK Bethel PA	9495eu	15265eu			
2000	2100		USA, WRMI Miami FL	15725am				
2000	2100		USA, WRNO New Orleans LA	7395am				
2000	2100		USA, WTJC Newport NC	9370na				
2000	2100		USA, WWCR Nashville TN	9475na	12160na	13845na		
			15685na					
2000	2100		USA, WWRB Manchester TN	9320va	12170va			
2000	2100		USA, WYFR Okeechobee FL	3230af	17525sa			
2000	2100	vi	Vanuatu, Radio	4960do	7260do			
2000	2100		Zambia, Christian Voice	4965af				
2000	2100	vi	Zambia, Radio ZNBC	4910do	6265al			
2000	2100	vi	Zimbabwe, ZBC Corp	5975do	6045al			
2000	2100	mwf	USA, WSHB Cypress Creek SC	15665af				
2005	2100	vi	Syria, Radio Damascus	12085eu	13610eu			
2020	2130	vi/ m	Vatican City, Vatican Radio	9645eu				
2025	2045		Italy, RAI Intl	6010af	9710af	11880af		
2030	2045	vi	Libya, Voice of Africa	15435irr	17750irr			
2030	2045		Thailand, Radio	9535eu				
2030	2055		Belgium, Radio Vlaanderen Intl	7465eu				
2030	2057		Vietnam, Voice of	7145eu	9730eu			
2030	2100	t	Belarus, Radio Belarus Intl	7105eu	7210eu			
2030	2100		Cuba, Radio Havana	13660usb	13750eu			
2030	2100		Georgia, Georgian Radio	11760eu				
2030	2100		Poland, Radio Polonia	7165eu	7265eu			
2030	2100	vi	Solomon Islands, SIBC	5020do				
2030	2100		Sweden, Radio	6065va	9445va			
2030	2100		Uzbekistan, Radio Tashkent	5025eu	11905eu			
2045	2100		India, All India Radio	7150eu	7410eu	9950au	11620eu	11715eu
2050	2100		Vatican City, Vatican Radio	4005eu	5890eu	7250eu		
2051	2100		New Zealand, Radio NZ Intl	17675pa				

2100 UTC - 4PM E / 3PM C / 1PM P

2100	2127		Czech Rep, Radio Prague Intl	5930va	9430va			
2100	2130		Australia, ABC NT Katherine	2485do				
2100	2130		Australia, ABC NT Tennant Crk	2325do				
2100	2130		China, China Radio Intl	11640eu	11790eu	13630eu	15110af	
2100	2130		Cuba, Radio Havana	13660usb	13750eu			
2100	2130		Kenya, Kenya BC Corp	4885do	4935do			
2100	2130		Nigeria, Radio/Ibadan	6050do				
2100	2130		Thailand, Radio	9530va				
2100	2145		Germany, Deutsche Welle	11645af	11890va	15275va	15410va	
			17765af					
2100	2156		North Korea, Voice of	13760eu	15245eu			
2100	2159		Canada, Radio Canada Intl	5850va	5995va	7235va	7425va	

2100	2200		9770va 9805va 13650va					
2100	2200		Anguilla, Caribbean Beacon	11775am				
			Australia, Radio	5995pa	6020pa	7240va	9500as	9580va
			9660pa 11880va	12080va	17715va	21740va	21820as	
2100	2200		Austria, AWR	9660af				
2100	2200	vi	Botswana, Radio	3356do	4820do			
2100	2200		Canada, CBC Northern Service	9625do				
2100	2200		Canada, CFRX Toronto ON	6070do				
2100	2200		Canada, CFVP Calgary AB	6030do				
2100	2200		Canada, CKZN St John's NF	6160do				
2100	2200		Canada, CKZU Vancouver BC	6160do				
2100	2200		Costa Rica, R for Peace Intl	15040am				
2100	2200		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am 13750na	17645as				
2100	2200		Ecuador, HCBJ	11895eu				
2100	2200	mtwhf	Eqt Guinea, Radio Africa		15185af			
2100	2200	vi	Ghana, Ghana BC Corp	3366do	4915do			
2100	2200		Guyana, Voice of	3290do	5950do			
2100	2200		India, All India Radio	7150eu	7410eu	9950au	11620eu	
			11715eu					
2100	2200		Japan, Radio	6035oc	6055oc	6090eu	6180eu	
			11830eu 11850oc	11855af	11920oc	17825na	17860oc	
			21670na					
2100	2200	ireg	Liberia, ELWA	4760do				
2100	2200		Liberia, R Liberia Intl	5100do				
2100	2200		Malaysia, Radio	7295do				
2100	2200		Namibia, NBC	3270af	3290af			
2100	2200		Nigeria, Radio/Enugu	6025do				
2100	2200		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2100	2200		Nigeria, Radio/Lagos	3326do	4990al			
2100	2200		Palau, KHBN/VO Hope	9985as				
2100	2200	mtwhfa	Papua New Guinea, NBC	4890do	9675al			
2100	2200		Romania, R Romania Intl	9510eu	9725eu	11740eu		
			11940eu					
2100	2200	vi	Solomon Islands, SIBC	5020do				
2100	2200		South Korea, R Korea Intl	15575eu				
2100	2200	as	Spain, R Exterior Espana	7275af	9665eu			
2100	2200	vi	Syria, Radio Damascus	12085eu	13610eu			
2100	2200		UK, BBC World Service	3255af	3915as	5965as	5975va	6005af
			6110as 6190af	6195va	9410va	12095va	15400af	
			17830af					
2100	2200		USA, Armed Forces Network	4319usb	4993usb	5765usb		
			6350usb 6458usb	10320usb	10940usb	12579usb	12689usb	
			13362usb					
2100	2200		USA, KAU Dallas TX	13815va				
2100	2200		USA, KIMF Otero NM	11885na				
2100	2200		USA, KTBN Salt Lk City UT		15590na			
2100	2200		USA, Voice of America	6035af	6040va	6095va	7415af	9595va
			9670va 9760va	11870va	11975af	13710af	15185va	
			15240af 15580af	17735va	17820va	17895af		
2100	2200		USA, WBCQ Kennebunk, ME	7415na	9335na	17495na		
2100	2200		USA, WEWN Birmingham AL	11530na	13615na	15745na		
			17595eu					
2100	2200		USA, WHRA Greenbush ME	17650va				
2100	2200		USA, WHRI Noblesville IN	5745va	9495va			
2100	2200		USA, WINB Red Lion PA	13570am				
2100	2200		USA, WJIE Louisville KY	7490am	13595am			
2100	2200		USA, WMLK Bethel PA	15265eu				
2100	2200		USA, WRMI Miami FL	15725am				
2100	2200		USA, WRNO New Orleans LA	7395am				
2100	2200	mw	USA, WSHB Cypress Creek SC	11650eu				
2100	2200	f	USA, WSHB Cypress Creek SC	15665af				
2100	2200		USA, WTJC Newport NC	9370na				
2100	2200		USA, WWCR Nashville TN	9475na	12160na	13845na		
			15685na					
2100	2200		USA, WWRB Manchester TN	9320va	12170va			
2100	2200		USA, WYFR Okeechobee FL	15565eu	17575sa	21455eu		
2100	2200	vi	Vanuatu, Radio	4960do	7260do			
2100	2200		Zambia, Christian Voice	4965af				
2100	2200	vi	Zambia, Radio ZNBC	4910do	6265al			
2100	2200	vi	Zimbabwe, ZBC Corp	5975do	6045al			
2130	2200		Australia, ABC NT Alice Springs	4835do				
2130	2200		Australia, ABC NT Katherine	5025do				
2130	2200		Australia, ABC NT Tennant Crk	4910do				
2130	2200		Australia, Radio	11660as				
2130	2200	mtwhf	Austria, Radio Austria Intl	5945va	6155eu			
2130	2200		China, China Radio Intl	11790eu	15110eu			
2130	2200		Iran, VOIRI	9780as	11740au			
2130	2200		Turkey, Voice of	9525va				
2130	2200	t f	UK, BBC World Service	11680sa				
2130	2200	f	UK, Wales Radio Intl	7325eu				
2130	2200		Uzbekistan, Radio Tashkent	5025eu	11905eu			

Shortwave Guide



2200 UTC - 5PM E / 4PM C / 2PM P

2200	2205	vi	Syria, Radio Damascus	12085eu	13610eu			
2200	2227		Iran, VOIRI	9780as	11740au			
2200	2228		Hungary, Radio Budapest	3975eu	6025eu			
2200	2229		Canada, Radio Canada Intl	5850va	6045va	9770va	9805va	
2200	2230		Azerbaijan, Voice of	6110as				
2200	2230		India, All India Radio	7150eu	7410eu	9950au	11620eu	
			11715eu					
2200	2230		South Korea, R Korea Intl	3955eu				
2200	2230		Turkey, Voice of	9525va				
2200	2230		USA, Voice of America	6035af	7215va	7415af	9770va	9890va
			11655af	11760va	11975af	13710af	15185va	15290va
			15305va	17735va	17820va			
2200	2230		Yugoslavia, R Yugoslavia	6100eu				
2200	2230	vi	Zambia, Radio ZNBC	4910do	6265af			
2200	2230	vi	Zimbabwe, ZBC Corp	5975do	6045af			
2200	2245		USA, WYFR Okeechobee FL	15565af				
2200	2300		Anguilla, Caribbean Beacon	6090am				
2200	2300		Australia, ABC NT Alice Springs	4835do				
2200	2300		Australia, ABC NT Katherine	5025do				
2200	2300		Australia, ABC NT Tennant Crk	4910do				
2200	2300		Australia, Radio	5995pa	6020pa	9580va	11650va	
			11660as	13620as	15230as	17715va	17795va	21740va
2200	2300		Bulgaria, Radio	5800eu	7500eu			
2200	2300		Canada, CBC Northern Service	9625do				
2200	2300		Canada, CFRX Toronto ON	6070do				
2200	2300		Canada, CFVP Calgary AB	6030do				
2200	2300		Canada, CKZN St John's NF	6160do				
2200	2300		Canada, CKZU Vancouver BC	6160do				
2200	2300		China, China Radio Intl	9880eu				
2200	2300		Costa Rica, R for Peace Intl	15040am				
2200	2300		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
2200	2300	mtwhf	Eat Guinea, Radio Africa	15185af				
2200	2300	vi	Ghana, Ghana BC Corp	3366do	4915do			
2200	2300		Guyana, Voice of	3290do	5950do			
2200	2300		Liberia, R Liberia Intl	5100do				
2200	2300		Malaysia, Radio	7295do				
2200	2300		Namibia, NBC	3270af	3290af			
2200	2300		New Zealand, Radio NZ Intl	17675pa				
2200	2300		Nigeria, Radio/Enugu	6025do				
2200	2300		Nigeria, Radio/Kaduna	4770do	6090do	9570do		
2200	2300		Nigeria, Radio/Lagos	3326do	4990af			
2200	2300		Palau, KHBN/VO Hope	9965as	9985as			
2200	2300	vi	Solomon Islands, SIBC	5020do				
2200	2300		Taiwan, R Taipei Intl	15600eu				
2200	2300		UK, BBC World Service	5975va	6195va	7105as		
			11685as	12095va	15400af	17830af		
2200	2300		Ukraine, R Ukraine Intl	5905eu	6020eu	7240eu	9560eu	
2200	2300		USA, Armed Forces Network	4319usb	4993usb	5765usb		
			6350usb	6458usb	10320usb	10940usb	12579usb	12689usb
			13362usb					
2200	2300		USA, KAUJ Dallas TX	13815va				
2200	2300		USA, KIMF Otero NM	11885na				
2200	2300		USA, KTBN Salt Lk City UT	15590na				
2200	2300		USA, KWHR Naalehu HI	17510as				
2200	2300		USA, WBCQ Kennebunk, ME	7415na	9335na			
2200	2300		USA, WEWN Birmingham AL	9975na	11530na	13615na		
			17595eu					
2200	2300		USA, WHRA Greenbush ME	7580va	17650va			
2200	2300		USA, WHRI Noblesville IN	5745va	9495va			
2200	2300		USA, WINB Red Lion PA	13570am				
2200	2300		USA, WJIE Louisville KY	7490am	13595am			
2200	2300		USA, WRMI Miami FL	15725am				
2200	2300		USA, WRNO New Orleans LA	7395am				
2200	2300	h	USA, WSHB Cypress Creek SC	7510eu				
2200	2300	w	USA, WSHB Cypress Creek SC	15285sa				
2200	2300		USA, WTJC Newport NC	9370na				
2200	2300		USA, WWCR Nashville TN	7465na	9475na	12160na		
			13845na					
2200	2300		USA, WWRB Manchester TN	9320va	12170va			
2200	2300		USA, WYFR Okeechobee FL	11740na				
2200	2300	vi	Vanuatu, Radio	4960do	7260do			
2200	2300		Zambia, Christian Voice	4965af				
2205	2230		Italy, RAI Intl	11895as				
2230	2255		Belgium, Radio Vlaanderen Intl	13700na				
2230	2257		Czech Rep, Radio Prague Intl	7345va	9435va			
2230	2300	mtwhfa	Albania, Radio Tirana Intl	7110eu	9540eu			
2230	2300		Australia, Radio	9475as				
2230	2300		Cuba, Radio Havana	9550am				
2230	2300		Sweden, Radio	6065va				
2245	2300		India, All India Radio	9705as	9950as	11620as	13605as	

2300 UTC - 6PM E / 5PM C / 3PM P

2300	0000		Anguilla, Caribbean Beacon	6090am				
2300	0000		Australia, ABC NT Alice Springs	4835do				
2300	0000		Australia, ABC NT Katherine	5025do				
2300	0000		Australia, ABC NT Tennant Crk	4910do				
2300	0000		Australia, Radio	9475as	9580va	9660pa	11650pa	11660as
			12080va	13620as	15230as	17715va		
2300	0000		Bulgaria, Radio	9400na	11700na			
2300	0000		Canada, CBC Northern Service	9625do				
2300	0000		Canada, CFRX Toronto ON	6070do				
2300	0000		Canada, CFVP Calgary AB	6030do				
2300	0000		Canada, CKZN St John's NF	6160do				
2300	0000		Canada, CKZU Vancouver BC	6160do				
2300	0000		China, China Radio Intl	5990na	13680na			
2300	0000		Costa Rica, R for Peace Intl	7445va	15040va			
2300	0000		Costa Rica, University Network	5030am	6150am	7375am	9725sa	
			11870am	13750na	17645as			
2300	0000	vi	Croatia, Croatian Radio	9925na				
2300	0000		Egypt, Radio Cairo	9900na				
2300	0000	vi	Ghana, Ghana BC Corp	3366do	4915do			
2300	0000		Guyana, Voice of	3290do	5950do			
2300	0000		India, All India Radio	9705as	9950as	11620as	13605as	
2300	0000		Liberia, R Liberia Intl	5100do				
2300	0000		Malaysia, Radio	7295do				
2300	0000		Namibia, NBC	3270af	3290af			
2300	0000		New Zealand, Radio NZ Intl	17675pa				
2300	0000		Palau, KHBN/VO Hope	9965as	9985as			
2300	0000		Romania, R Romania Intl	15105na	9570eu	11740na	11775na	
2300	0000		Singapore, SBC Radio One	6150do				
2300	0000		Sri Lanka, SLBC	4940do				
2300	0000		UK, BBC World Service	3915as	5965as	5975va	6195va	7105as
			11685as	11945as	11955as	12095va	15280as	
2300	0000		USA, Armed Forces Network	6458usb	10320usb	10940usb	12579usb	12689usb
			USA, KAUJ Dallas TX	13815va				
2300	0000		USA, KIMF Otero NM	11885na				
2300	0000		USA, KTBN Salt Lk City UT	15590na				
2300	0000		USA, KWHR Naalehu HI	17510as				
2300	0000		USA, Voice of America	6180va	7215va	7205va	9620va	9770va
			9780va	11735va	11760va	11805va	13640va	15135va
			15205va	15290va	15135va	17735va	17820va	
2300	0000		USA, WEWN Birmingham AL	9355na	9975na	13615na	17595eu	
2300	0000		USA, WHRA Greenbush ME	7580eu				
2300	0000		USA, WHRI Noblesville IN	5745va	9495va			
2300	0000		USA, WINB Red Lion PA	12160am				
2300	0000		USA, WJIE Louisville KY	7490am	13595am			
2300	0000		USA, WRMI Miami FL	15725am				
2300	0000		USA, WRMI Miami FL	15725am				
2300	0000	w	USA, WSHB Cypress Creek SC	7510af				
2300	0000	as	USA, WTJC Newport NC	9370na				
2300	0000		USA, WWBS Macon GA	11900na				
2300	0000		USA, WWCR Nashville TN	13845na	5070na	7465na	9475na	
2300	0000		USA, WWRB Manchester TN	9320va	12170va			
2300	0000		USA, WYFR Okeechobee FL	5985sa	11855sa	15170sa	15400sa	
2300	0000	vi	Vanuatu, Radio	4960do	7260do			
2300	0000		Zambia, Christian Voice	4965af				
2300	2230		Mexico, Radio Mexico Intl	9705am	11770am			
2300	2329		Canada, Radio Canada Intl	5960am	9590am	11865am		
2300	2330		Cuba, Radio Havana	9550am				
2300	2330		Nigeria, Radio/Enugu	6025do				
2300	2330		Nigeria, Radio/Kaduna	4770do	6090do			
2300	2330		Nigeria, Radio/Lagos	3326do	4990af			
2300	2330	vi	Solomon Islands, SIBC	5020do				
2300	2345		Germany, Deutsche Welle	9470as	9815as	13690as	21790as	
2300	2345		USA, WYFR Okeechobee FL	11740na				
2300	2350		Turkey, Voice of	6020va	9655va			
2330	0000		Australia, Radio	11695as	15415as			
2330	0000		Canada, Radio Canada Intl	5960na	9590na			
2330	0000		Lithuania, R Vilnius	9875eu				
2330	0000		Netherlands, Radio	6165na	9845na			
2330	0000		Switzerland, Swiss R Intl	9885sa	11660sa			
2330	0000		UAE, Gospel For Asia	6145as				
2330	0000		UK, BBC World Service	6035as				
2330	2345	vi	Libya, Voice of Africa	15433ir	17750ir			
2330	2357		Czech Rep, Radio Prague Intl	9745na	21455usb			
2330	2357		Vietnam, Voice of	9840as	12020as			

**Notes:**

1. The **BBC World Service Americas stream [BBCWS(am)]** is on shortwave at these times and on these frequencies: 0900-1000, 1000-1100 (weekends only) and 1100-1700 on 15190; 1000-1400 on 6195; 1100-1130 on 17790; 2100-0300 on 12095; 2100-0500 on 5975; 0000-0300 on 9825; 0100-0400 on 9525; 0400-0600 on 6135.

2. Some **R. New Zealand Int.** programming may be pre-empted from time to time for coverage of live sports events. Consult <www.rnzi.com> for schedule.

3. Special Holiday Season programming later in the month will likely preempt some of the listed programs that appear below. Some direction in this regard is provided in this month's headnotes on the first page of the Shortwave Guide.

0000 UTC / 7pm E / 4pm P - Page 43 Freqs

SUNDAY

0000	R. Netherlands	Music 52/15 (Martha Hawley, musical styles from around the globe)
	WBCQ(7415kHz.)	The Real Amateur Radio Show
0001	BBCWS(am)	Play of the Week (classic and contemporary drama for radio)
0005	R. Australia	The Europeans (historical and cultural perspectives on European societies)
	R. Canada Int.	Quirks and Quarks (Bob McDonald with what's new and next in science)
	R. New Zealand Int.	At the Movies (Simon Morris with reviews and movie news)
0010	R. Japan	Hello from Tokyo (listener letters, music and short features)
0030	R. Netherlands	Dutch Classics (Helen Michaud with Dutch classical music)
	R. New Zealand Int.	Bookmarks (books and book people in NZ)
	WBCQ(7415 kHz.)	Fred Flintstone's Music Show
	WWCR(12160kHz)	The Old Record Shop (vintage recordings)
0035	R. Australia	Ockham's Razor (sharp commentaries on science topics)

MONDAY-FRIDAY

0005	R. New Zealand Int.	Cadenza (light classical music selections)
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MONDAY

0000	BBCWS(am)	World Briefing
	WBCQ(7415kHz.)	Le Show (Harry Shearer with a tour-de-force variety show)
	R. Netherlands	Dutch Horizons (Bertine Krol chronicles life in Holland)
0005	R. Canada Int.	Global Village (Jowi Taylor fields reports and music from global venues)
0010	R. Australia	Awow! (Aboriginal social, political, arts and culture program)
	R. Bulgaria	Folk Studio (Bulgarian folk music)
	R. Japan	Weekend Square (aspects of Japan with interviews, music)
0020	BBCWS(am)	Sports Roundup
0030	BBCWS(am)	The World Today (the BBC's agenda-setting flagship global news program)
	R. Bulgaria	Bulgarian Plaza (bimonthly cultural magazine)
		Walks and Talks (interesting places in Bulgaria, aired bimonthly)
	R. Netherlands	The Sound Fountain (interesting topics approached in an unusual way using sound montage, esoteric conversations, inner musings and atmospheric music)

TUESDAY-SATURDAY

0005	BBCWS(am)	Outlook (topical magazine of people, places and events)
0005	R. Canada Int.	As It Happens (continues from Mon.-Fri. 2330)
0010	R. Bulgaria	Events and Developments (reports, analyses and commentary on Balkan events)
0015	R. Japan	44 Minutes (daily current affairs magazine about Japan and Asia)
0033	VOA News Now	Coast to Coast (daily magazine of life in the USA hosted by Dave Arlington)

TUESDAY

0000	R. Netherlands	The Research File (a magazine emphasizing the relevance of science to all our lives)
0010	R. Australia	The Science Show (Robyn Williams one of the longest running programs on ABC Radio)
0030	R. Netherlands	EuroQuest (a magazine placing Europe in context)
0045	BBCWS(am)	Write On (listeners comment on BBC programs)

WEDNESDAY

0000	R. Netherlands	Music 52/15 [refer to 0000 S]
0010	R. Australia	The National Interest (Terry Lane's round-up of the week's major issues)
0030	R. Netherlands	A Good Life (how development affects societies)
0045	BBCWS(am)	Heart and Soul (how beliefs, values and religion affect individuals)

THURSDAY

0000	R. Netherlands	The Weekly Documentary (award-winning sound essays and in-depth investigations)
	WBCQ(7415kHz)	Off the Hook (discussing computer and information technology issues)
0010	R. Australia	Background Briefing (award-winning current affairs documentary program)
0030	R. Canada Int.	Dispatches (a Canadian perspective on international news topics)
	R. Netherlands	Dutch Horizons [refer to 0000 M]
0045	BBCWS(am)	Westway (first weekly episode of this continuing drama)

FRIDAY

0000	R. Netherlands	The Sound Fountain [refer to 0030 M]
	WBCQ(7415kHz.)	Goddess Irina 1 Music Show (your guess is as good as mine-ed.)
0010	R. Australia	Hindsight (Australian social history from the memories of those who were there)
0030	R. Netherlands	The Research File [refer to 0000 T]
0045	BBCWS(am)	What's the Problem? (a panel of experts offers advice to listeners)

SATURDAY

0000	R. Netherlands	A Good Life [refer to 0030 T]
	WBCQ(7415kHz)	The Lost Discs Radio Show (spinning obscure oldies)
0005	R. Australia	Feedback [refer to 0005 A]
	R. New Zealand Int.	Your Money (Bruce Wallace and panel discuss financial trends)
0030	R. Australia	Country Breakfast (Australian rural and regional issues)
	R. Netherlands	The Weekly Documentary [refer to 0000 H]
	R. New Zealand Int.	The Saturday Comedy Zone
0045	BBCWS(am)	Westway (second weekly episode of this continuing drama)

0100 UTC / 8pm E / 5pm P - Page 43 Freqs

SUNDAY

0100	BBCWS(am)	The World Today [refer to 0030 M]
	HCB Ecuador	DX Parlyline (Allen Graham hosts a weekly program for DXers and SWLs)
	WBCQ(7415kHz)	A Different Kind of Oldies Show (a unique mix of oldies music with "Big Steve" Cole)
0105	Deutsche Welle	Talking Point (European journalists discuss the week's events)
	R. Australia	In Conversation (Robyn Williams talks to scientists and those interested in science)
	R. Netherlands	Europe Unzipped (a 'zippy' compilation of news and views from Europe)
0105	R. Prague	Insight Central Europe (regional current affairs magazine produced jointly by R. Prague, R. Austria Int., R. Slovakia, R. Polonia and R. Budapest)
0115	Deutsche Welle	Inside Europe (a weekly magazine exploring the topical issues shaping the continent)
0120	China R. Int.	In the Spotlight (Chinese arts and cultural magazine)
0130	BBCWS(am)	World Business Review (the week in business and the financial markets)
	HCB Ecuador	Saludos Amigos (Yvonne Kennedy and Sharon Bulmer host this popular program of international friendship)
	R. Australia	Oz Sounds (Australian new music releases)
	R. New Zealand Int.	The Band Programme (brass band music with John Harrison)
	RTE Ireland	Sportsnews (reports and accounts on the weekend's events)
0140	R. Habana Cuba	DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

0145 BBCWS(am)

Letter from America (Alistair Cooke's weekly commentary on life in the USA)

MONDAY-FRIDAY

0105	R. New Zealand Int.	In Touch with New Zealand (a domestic afternoon variety program hosted by Wayne Mowat; this hour features popular music set to a theme)
0110	R. Australia	Asia-Pacific (current affairs and business report about Asia and the Pacific)

MONDAY

0100	BBCWS(am)	The World Today [refer to 0030 M]
	HCB Ecuador	Musical Mailbag (listener letters, food and the question of the week)
	R. Habana Cuba	Weekly Review (Cuba's perspective on current events)
	WBCQ(7415kHz.)	Radio New York International (Johnny Lightning plays classic rock to 0500)
0105	Deutsche Welle	Religion and Society (religious events and issues around the world)
0115	Deutsche Welle	Wide Angle (a single issue examined in-depth)
		Arts on the Air (Breandain O'Shea covers the German cultural scene)
	R. Prague	Readings from Czech Literature
0130	China R. Int.	People in the Know (interviews with prominent Chinese who are shaping the nation's future)
	R. Australia	The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
	RTE Ireland	Sportsnews (reports and accounts on the weekend's events)
0140	R. Habana Cuba	The Mailbag Show (listener letters)
0150	R. Habana Cuba	Breakthrough (Arnie Coro's weekly science report)

TUESDAY-SATURDAY

0100	R. Netherlands	Newsline (RN's flagship international current affairs program)
0105	Deutsche Welle	Newslink (daily current affairs magazine focused on Europe)
0110	HCB Ecuador	Studio 9 (daily magazine with focused reports on Latin America)
0130	RTE Ireland	The News at Six (RTE's flagship evening news program)

TUESDAY

0105	BBCWS(am)	Meridian-Masterpiece (critical examinations of creative endeavors)
0130	BBCWS(am)	Charlie Gillett (world music)
	China R. Int.	Biz China (business and finance in the Chinese market)
	Deutsche Welle	Insight (a look at major international trends and developments)
	R. Australia	The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas)
0144	VOA News Now	Dateline (an 11-minute weekday documentary that examines a major issue unfolding in America or the world)

WEDNESDAY

0100	WBCQ(7415kHz)	Good Morning Maine
0105	BBCWS(am)	Meridian-Screen (the film arts)
0130	BBCWS(am)	UK Top Twenty (music from the British rock and pop charts)
	Deutsche Welle	Man and Environment (John Hay presents the human element in environmental issues.)
	R. Australia	The Religion Report (Stephen Crittenden examines the way religion and societies interact)
0140	R. Habana Cuba	DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)
0144	VOA News Now	Dateline [refer to 0144 T]

THURSDAY

0105	BBCWS(am)	Meridian-Writing (reports on books, theatre, poetry, journalism, biography, history and anthropology)
0120	HCB Ecuador	Ham Radio Today
0130	BBCWS(am)	Revolver (musicians play their favorites among the new releases)
	Deutsche Welle	Living in Germany (people, places and events in Germany)
	R. Australia	The Media Report (Mick O'Regan takes a critical look at the latest developments in the communications industry)
0144	VOA News Now	Dateline [refer to 0144 T]

FRIDAY

0105	BBCWS(am)	The Music Biz (the global music business examined)
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Shortwave Guide



- 0130 BBCWS(am) John Peel (innovative and eclectic pop music)
China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
Deutsche Welle Hard to Beat—The World of Sport (weekly report on German and European sport)
R. Australia The Sports Factor (Amanda Smith presents reports which debate and celebrate the cultural significance of sport)
0144 VOA News Now Dateline [refer to 0144 T]

SATURDAY

- 0100 WBCQ(7415kHz) Allan Weiner Worldwide (the station manager's show)
0105 BBCWS(am) Arts in Action (weekly global arts magazine)
R. Australia Asia Pacific Weekend Edition (a weekly current events and business report)
R. New Zealand Int. Eureka! (Allan Coukell reports on science in NZ)
0110 HCB Ecuador Music del Ecuador (Jorge Zambrano with Andean musical selections)
0120 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
0130 BBCWS(am) Jazzmatazz (weekly global jazz magazine)
Deutsche Welle German by Radio (a language lesson)
R. Australia RA Arts (Julie Copeland presents the world of arts and cultural ideas)
R. New Zealand Int. Health Matters (health issues and developments with Louise Wallace)
0133 VOA News Now News Review (VOA correspondents in the field and from VOA language services join Neal Lavon to discuss the week's major events)

0200 UTC / 9pm E / 6pm P - Page 44 Freqs

DAILY

- 0230 R. Austria Int. Report from Austria (a daily magazine focusing on Austria and central and eastern Europe)

SUNDAY

- 0200 WBCQ(7415kHz) Marion's Attic (rare and vintage recordings presented by Marion Webster)
0205 BBCWS(am) Composer of the Month (biography and music of a major Western classical music composer)
R. Australia Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
R. New Zealand Int. RPM (international documentary series)
0210 R. Canada Int. Business Sense (an in-depth look at Canadian companies in the global economy)
R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
0211 Voice of Russia News and Views (Russian views on news developments)
0215 R. Taipei Int. Great Wall Forum (the China-Taiwan issue from Taipei's perspective)
0230 BBCWS(am) Music Review (personalities, views and issues in international music)
R. Sweden Weekend (a magazine about Europe from the Radio E consortium, on the first week of the month); Sweden Today (George Wood presents the voices of Sweden, the second week of the month); Spectrum (Bill Schiller covers the Swedish cultural scene, the third week of the month); Studio 49 (conversations on ideas and long-term trends in Sweden and the Nordic region, the fourth week of the month)
0232 Voice of Russia Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
0235 R. Austria Int. Network Europe (a weekly magazine on Europe)
R. Canada Int. Canada in the World (Wojtek Gwiazda hosts a weekly magazine examining Canadian policies, priorities and international relations)
R. Habana Cuba The World of Stamps (philatelic matters)

MONDAY-FRIDAY

- 0205 R. New Zealand Int. In Touch with New Zealand (continues from 0105, this hour includes interviews and music)
0210 R. Australia The World Today (a comprehensive current affairs program with Monica Attard and John Highfield)
0245 R. Taipei Int. Let's Learn Chinese

MONDAY

- 0200 WBCQ(7415kHz) Radio New York International (continues from 0100)
0205 BBCWS(am) Wright Around the World (Steve Wright playing musical requests)
R. Budapest Spotlight (a monthly magazine)[1st M]; Europe Unlimited (Hungary's relations with the rest of Europe)[2nd M]; Heading for Hungary (a monthly

- 0210 R. Canada Int.

- R. Habana Cuba

- 0215 R. Prague
R. Taipei Int.

- 0230 R. Habana Cuba

- R. Sweden

- 0232 Voice of Russia

- 0235 R. Austria Int.
R. Canada Int.

TUESDAY-SATURDAY

- 0210 R. Budapest

- R. Canada Int.

- 0211 Voice of Russia

- 0230 R. Sweden

TUESDAY

- 0205 BBCWS(am)

- 0230 BBCWS(am)

- 0232 Voice of Russia

- 0235 R. Canada Int.

- 0245 R. Sweden

WEDNESDAY

- 0200 HCB Ecuador

- 0205 BBCWS(am)

- 0230 BBCWS(am)

- 0232 Voice of Russia

- 0235 R. Canada Int.

- 0245 R. Sweden

THURSDAY

- 0205 BBCWS(am)

- 0215 R. Taipei Int.

- 0230 BBCWS(am)

- 0235 R. Canada Int.

- 0245 R. Sweden

FRIDAY

- 0205 BBCWS(am)

- 0230 BBCWS(am)

- 0235 R. Canada Int.

- 0245 R. Sweden

travelogue)[3rd M]; And the Gatepost (listener letters)[4th M]

The Maple Leaf Mailbag (Ian Jones answers listener mail and hosts the fortnightly CIOX Report for dxers)
From Havana (a showcase of contemporary Cuban music and musicians)
Readings from Czech Literature

Jade Bells and Bamboo Pipes (Carson Wong introduces selections of traditional Chinese music)
Top Tens (Cuba's most popular music) [1st/3rd wk.]
The Jazz Place (the very best of Cuban jazz)[2nd/4th wk.]

In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström); Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)
Timelines (Estelle Winters' variety show giving insight into life in Moscow through foreign eyes)

Insight Central Europe [refer to 0105 S]
Spotlight (a magazine touching on all facets of artistic and cultural life in Canada)

Hungary Today (daily magazine covering current events in Hungary)
Canada Today (interviews, correspondents' reports and views on world and national events)
Commonwealth Update (comments on domestic developments and major domestic issues)
Sixty Degrees North (reports, interviews and analysis on the Nordic region)

Health Matters (reports on the latest medical research)

Everywoman (an international magazine for women)

Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)

Media Zone (Ian Jones hosts a weekly forum with Canadian journalists discussing topical issues facing Canadians)

Sports Scan (a weekly report on sports in the Nordic region)

The Book and the Spade (the latest discoveries and developments in Biblical archaeology)

Go Digital (technology journalist Tracey Logan explains the latest in IT)

Omnibus (a weekly documentary tackling any topic across the globe)

The Jazz Show (recordings from the Russian world of jazz)

Spotlight [refer to 0235 M]

Close Up (profiles of people in Sweden from all walks of life)

Discovery (in-depth exploration of science and technology topics)

Discover Taiwan (exploring aspects of the island)
Sports International (the issues and personalities behind the headlines)

The Maple Leaf Mailbag [refer to 0210 M]

Money Matters (a weekly economic report on the Nordic region)

One Planet (the environment, development, agriculture and human impact on the natural world)

Documentaries (social, cultural and political features and series)

Business Sense [refer to 0210 S]

Nordic Report (a monthly magazine on Scandinavia produced by the broadcasters of the Nordic region and broadcast the first week of the month); Greenscan (Azariah Kiro highlights Swedish environmental awareness and challenges the second week of the month); Heart Beat (Gaby Katz hosts a monthly health and medical magazine, the third week of the month); The S-Files (Kris Boswell

takes you to the Sweden behind the headlines, the fourth week of the month)

SATURDAY

- 0200 WBCQ(7415kHz)

- 0205 BBCWS(am)

- R. New Zealand Int.

- 0210 R. Australia

- 0230 BBCWS(am)

- 0235 R. Canada Int.

Tasha Takes Control (upbeat progressive music)
Science in Action (Richard Black reports on science and technology)

The Mix (new music, interviews and sessions with rock, dance, hip-hop and pop musicians)

Background Briefing [refer to 0010 H]

Documentaries (social, cultural and political features and series)

Canada in the World [refer to 0235 S]

0300 UTC / 10pm E / 7pm P - Page 44 Freqs

DAILY

- 0300 BBCWS(am)

- 0320 BBCWS(am)

World Briefing

Sports Roundup

SUNDAY

- 0300 HCB Ecuador

- WBCQ(7415kHz)

- 0305 R. Australia

- R. New Zealand Int.

- 0311 Voice of Russia

- 0315 Deutsche Welle

- R. Taipei Int.

- 0320 China R. Int.

- 0330 BBCWS(am)

- R. Australia

- R. Sweden

- WWCR(5070kHz)

- 0332 Voice of Russia

- 0340 R. Habana Cuba

Inspirational Classics (classical music inspired by religious and spiritual themes)

Pocket Calculator (discussing small consumer electronic devices of the past)

Feedback [refer to 0005 A]

Sunday Drama (classic and contemporary radio drama from around the world)

Moscow Mailbag (VOR's top-rated program in which Joe Adamov answers listener questions and talks about the latest rumors and jokes sweeping Moscow)

Spectrum (developments in the fields of science and technology)

Great Wall Forum [refer to 0215 S]

In the Spotlight (Chinese arts and cultural magazine)

Reporting Religion (Trevor Barnes reports on global religious and ethical issues)

All in the Mind (a foray into the mental universe, the mind, the brain and human behavior)

[refer to 0230 S] Weekend (1st week); Sweden Today (2nd week); Spectrum (3rd week); Studio 49 (4th week)

World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)

Songs from Russia (melodies and musical novelties from Russia's past)

DXers Unlimited (Amie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY

- 0300 R. New Zealand Int.

- 0320 R. Australia

- 0345 R. Taipei Int.

Pacific Regional News

Pacific Focus (reports on business, health, environment, sport and culture in the Pacific region)

Let's Learn Chinese

MONDAY

- 0300 R. Habana Cuba

- KWHR(17510kHz)

- WBCQ(7415kHz)

- 0305 R. New Zealand Int.

- 0310 R. Bulgaria

- 0311 Voice of Russia

- 0315 Deutsche Welle

- Radio Taipei Int.

- 0325 R. Bulgaria

- 0330 BBCWS(am)

- China R. Int.

- R. Sweden

- 0332 Voice of Russia

- 0335 R. Budapest

Weekly Review (Cuba's perspective on current events)

DXing with Cumbre (Marie Lamb with the hottest DX catches)

Radio New York International (continues from 0100)

Tagata o te Moana (Anita Purcell presents a weekly Pacific magazine with NZ and regional Pacific news, issues, information and music)

Folk Studio (Bulgarian folk music)

Moscow Mailbag [refer to 0311 S]

Arts on the Air [refer to 0115 M]

Taiwan Economic Journal

Bulgarian Plaza (bimonthly cultural magazine)

Walks and Talks (interesting places in Bulgaria, aired bimonthly)

Assignment (documentaries that delve behind the headlines)

People in the Know (interviews with prominent Chinese who are shaping the nation's future)

[refer to 0230 M] In Touch with Stockholm (1st M); Sounds Nordic (all other weeks)

This is Russia (the cities and regions, culture and the arts, the countryside, religion and people)

Spotlight (a monthly magazine)[1st M]
Europe Unlimited (Hungary's relations with the rest of Europe)[2nd M]

Shortwave Guide



0340 R. Australia
R. Habana Cuba
0350 R. Habana Cuba

Heading for Hungary (a monthly travelogue)[3rd M]
And the Gatepost (listener letters)[4th M]
The Australian Music Show (the latest rock music from the Triple J youth network of the ABC)
The Mailbag Show (listener letters)
Breakthrough (Annie Coro's weekly science report)

TUESDAY-SATURDAY

0305 Deutsche Welle
0310 R. Bulgaria
0330 BBCWS(am)
R. Sweden
0335 R. Budapest

Newslink (daily current affairs magazine focused on Europe)
Events and Developments (reports, analyses and commentary on Bulgarian and Balkan events)
World Business Report (a guide through the main business issues of the day)
Sixty Degrees North (reports, interviews and analysis on the Nordic region)
Hungary Today (a daily magazine covering current events in Hungary)

TUESDAY

0305 R. New Zealand Int.
0311 Voice of Russia
0315 Radio Taipei Int.
0330 China R. Int.
Deutsche Welle
0332 Voice of Russia
0340 R. Australia
0345 BBCWS(am)
R. Sweden

Top Five and New Releases (the top five singles and new music releases in NZ with Greg Tatore)
Science and Engineering (reports on the latest developments in science and technology)
Jade Bells and Bamboo Pipes [refer to 0215 M]
Biz China (business and finance in the Chinese market)
Insight (a look at major international trends and developments)
Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
Music Deli (Australian performances of folk, acoustic, traditional and world music)
Analysis (background to the stories in the news)
Sports Scan (a weekly report on sports in the Nordic region)

WEDNESDAY

0305 R. New Zealand Int.
0311 Voice of Russia
0330 Deutsche Welle
R. New Zealand Int.
0340 R. Australia
R. Habana Cuba
0345 BBCWS(am)
R. Sweden

Pacific Report (RNZI correspondent Don Wiseman interviews and reports on regional matters)
Newmarket (news about business in Russia and Russia's involvement in international business)
Man and Environment (John Hay presents the human element in environmental issues.)
Tradewinds (Walter Zweifel with a weekly report on Pacific regional business and economic news)
Blacktracker (Mal Honess presents contemporary Aboriginal music)
DXers Unlimited (Annie Coro presents a program from radio enthusiasts)
Analysis (background to the stories in the news)
Close Up (profiles of people in Sweden from all walks of life)

THURSDAY

0305 R. New Zealand Int.
0311 Voice of Russia
0315 R. Taipei Int.
0330 Deutsche Welle
R. New Zealand Int.
0332 Voice of Russia
0340 R. Australia
0345 BBCWS(am)
R. Sweden

RNZI Talk (a fortnightly introduction to the RNZI and National Radio staff, along with RNZI developments, projects and programmes)
Mailbox (a fortnightly program aimed at the serious shortwave listener, with Myra Oh answering letters, Paul Ormandy reporting the latest DX news, and Frequency Manager Adrian Sainsbury answering technical questions)
Moscow Mailbag [refer to 0311 S]
Taipei Magazine
Living in Germany (people, places and events in Germany)
The World in Sport (Dmitri Edwards presents highlights of the world's sporting week with emphasis on NZ and the Pacific)
Moscow Yesterday and Today [refer to 0232 S]
Oz Country Style (country music from Australia)
From Our Own Correspondent (the background to international events from BBC correspondents around the world)
Money Matters (a weekly economic report on the Nordic region)

FRIDAY

0305 R. New Zealand Int.
0311 Voice of Russia
0315 R. Taipei Int.
0330 China R. Int.

Dateline Pacific (the major Pacific stories of the week, with background and reaction from the people making the news, presented by Don Wiseman)
Science and Engineering [refer to 0311 T]
Taiwan Gourmet
Life in China (a weekly magazine focusing on the

Deutsche Welle
HCJB Ecuador
R. New Zealand Int.
0332 Voice of Russia
0340 R. Australia
0345 BBCWS(am)
0345 R. Sweden

lives of ordinary people in China)
Hard to Beat: The World of Sport (weekly report on German and European sport)
The Book and the Spade (the latest discoveries and developments in Biblical archaeology)
Pacific Correspondent (RNZI's regional correspondents talk to Don Wiseman about political and social issues in their respective Pacific countries)
Russian by Radio (a language lesson)
Jazz Notes (Australian jazz presented by Ivan Lloyd)
Analysis (background to the stories in the news) [refer to 0245]
F Nordic Report [1st week]; Greenscan [2nd week]; Heart Beat [3rd week]; The S-Files [4th week]

SATURDAY

0300 WWCR(3215kHz.)
0305 R. Australia
R. New Zealand Int.
0311 Voice of Russia
0320 China R. Int.
0330 Deutsche Welle
HCJB Ecuador
R. Australia
R. New Zealand Int.
0332 Voice of Russia
0345 BBCWS(am)

World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
Rural Reporter (ABC's rural reporters present news and stories from rural and regional Australia)
Home Grown (Liz Barry with a comprehensive range of NZ music, new releases and music industry info)
Newmarket [refer to 0311 W]
Listeners' Garden (letters, touring, cooking and a language lesson)
German by Radio (a language lesson)
Walkin' in the Sunshine (Ben Cummings with the roots of country music)
In Conversation (Robyn Williams talks to scientists and those interested in the subject about what it's meant to their lives)
Musical Chairs (NZ music artist profiles and performances)
Audio Book Club (readings from the best of Russian classic and contemporary literature)
Analysis (background to the stories in the news)

0400 UTC / 11pm E / 8pm P - Page 45 Freqs

SUNDAY

0400 BBCWS(am)
HCJB Ecuador
RVi Belgium
WWCR(5070kHz)
0405 R. Australia
0410 R. New Zealand Int.
R. Prague
0411 Voice of Russia
0420 China R. Int.
0430 BBCWS(am)
HCJB Ecuador
KWHRI(17780kHz)
R. Australia
0432 Voice of Russia
0435 R. Habana Cuba
R. Netherlands
0440 R. New Zealand Int.
0455 R. Netherlands

The World Today (the BBC's agenda-setting flagship global news program)
DX Partyline (Allen Graham hosts a weekly program for DXers and SWLs)
Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
Spectrum (talking about radio, computers and communications)
Pacific Focus-Arts (reports on culture and the arts in the Pacific region)
Spiritual Outlook [or] Touchstone (religious discussion and debate)
SATURDAY Music (Czech classical, folk, jazz or rock music)
News and Views [refer to 0411 T-A]
In the Spotlight [refer to 0320 S]
Global Business (Peter Day charts the transformations sweeping through the world of work and commerce)
Saludos Amigos (Yvonne Kennedy and Sharon Bulmer host this popular international friendship program)
DXing with Cumbre (Marie Lamb with the hottest DX catches)
RA Arts [refer to 0130 A]
Kaleidoscope (the latest economic, social and cultural events in Russia and the CIS)
The World of Stamps (This just might be the only program on radio on philatelic matters)
Europe Unzipped (a 'zippy' compilation of news and views from Europe)
Jazz Spotlight (Haydn Sherley with an artist focus)
Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

MONDAY-FRIDAY

0400 R. New Zealand Int.
0410 R. Australia

Checkpoint (RNZ National Radio's flagship domestic evening news program)
Margaret Throsby (a guest is interviewed and presents favorite musical pieces)

MONDAY

0400 BBCWS(am)
HCJB Ecuador

The World Today [refer to 0400 S]
Musical Mailbag (listener letters, food and the

RVi Belgium
0405 WBCQ(7415kHz)
R. Habana Cuba
0415 R. Prague
0430 BBCWS(am)
China R. Int.
R. Habana Cuba
WHR(7315kHz)
0432 Voice of Russia
0435 R. Netherlands
0455 R. Netherlands

question of the week)
Radio World (Frans Vossen presents a weekly report about international radio)
Radio New York International (continues from 0100)
From Havana (a showcase of contemporary Cuban music and musicians)
Readings from Czech Literature
Westway Omnibus (last week's two episodes of this radio drama serial)
People in the Know [refer to 0330 M]
Top Tens (Cuba's most popular music) [1st/3rd wk.]
The Jazz Place (the very best of Cuban jazz)[2nd/4th wk.]
DXing with Cumbre (Marie Lamb with the hottest DX catches)
Audio Book Club [refer to 0332 A]
Sincerely Yours (RN's listener response program.)
The Week Ahead (a preview of what's on RN the next seven days)

TUESDAY-SATURDAY

0410 HCJB Ecuador
0411 Voice of Russia
0430 R. Netherlands
0445 BBCWS(am)
TUESDAY
0405 BBCWS(am)
0430 BBCWS(am)
China R. Int.

Studio 9 (daily magazine with focused reports on Latin America)
News and Views (Russian views on news developments)
Newsline (RN's flagship current affairs magazine)
Off the Shelf (abridged serialized readings of novels, stories and other literature)
Jazzmatazz (global jazz magazine)
A History of Political Thought (Charles Haviland surveys political theories)
Biz China [refer to 0330 T]

WEDNESDAY

0405 BBCWS(am)
0430 BBCWS(am)
THURSDAY
0405 BBCWS(am)
0420 HCJB Ecuador
0430 BBCWS(am)

Charlie Gillett (world music)
Write On (listeners comment on BBC programs)
John Peel (innovative and eclectic pop music)
Ham Radio Today
Heart and Soul (how beliefs, values and religion affect individuals)

FRIDAY

0405 BBCWS(am)
0430 BBCWS(am)
China R. Int.

Composer of the Month [refer to 0205 S]
Who on Earth Are We? (understanding our multicultural world)
Life in China [refer to 0330 F]

SATURDAY

0405 BBCWS(am)
R. Australia
0410 HCJB Ecuador
0420 China R. Int.
0430 BBCWS(am)
R. Australia

Brain of Britain (Robert Robinson chairs this perennially popular general knowledge quiz)
Pacific Focus-Environment (the past week's environmental news as reported on the weekday magazine, Pacific Beat)
Home Grown (continued from 0305)
Musica del Ecuador (Jorge Zambrano with Andean musical selections)
Listeners' Garden [refer to 0320 A]
Patterns of Faith (a global exploration of religious values and human wisdom)
The Buzz (the week's big technology news and issues presented by Richard Aedy)

0500 UTC / 12am E / 9pm P - Page 45 Freqs

SUNDAY

0500 HCJB Ecuador
R. Netherlands
WBCQ(7415kHz)
WWCR(5070kHz)
0505 BBCWS(am)
Deutsche Welle
R. Australia
R. New Zealand Int.
0510 R. Japan

Inspirational Classics (classical music inspired by religious and spiritual themes)
Dutch Classics (Helen Michaud with Dutch classical music)
Tom and Darryl (discussions about satellite, short-wave, LPFM and Internet communications)
Cyber Line (musings on the new technologies)
Wright Around the World [refer to 0205 M]
Talking Point (European journalists discuss the week's events.)
Pacific Focus-Business (reports on business in the Pacific region)
Whenua! (people, issues, music and comment in Aotearoa-the Maori name for NZ-with Henare te Ua and Libby Hakaraia)
Pop Joins the World (a look at Asia as it is now,

Shortwave Guide



0515 Deutsche Welle
0520 China R. Int.
0530 R. Australia
WWCR(3210kHz)
0532 Voice of Russia
0540 R. Habana Cuba

presenting the cultures and lifestyles of other Asian countries through their popular music)
Money Talks (DW's weekly financial magazine highlighting business in Europe)
In the Spotlight [refer to 0320 S]
Fine Music Australia (Australian classical music performances)
Ken's Country Classics (classic country music)
Timelines (Estelle Winters' variety show giving insight into life in Moscow through foreign eyes)
DXers Unlimited (Arnie Coro presents a program from radio enthusiasts)

MONDAY-FRIDAY

0500 BBCWS(am) WBCQ(7415kHz)
0507 R. New Zealand Int.
0510 R. Australia
0515 R. Japan
0530 R. New Zealand Int.
0545 R. New Zealand Int.

The World Today [refer to 0400 S]
Amos 'n Andy (the classic radio comedy from America's radio past)
What's Going On? (a daily update on entertainment and the arts in NZ)
Pacific Beat (one of RA's primary programs, this daily current events and features magazine focuses in on the Pacific island nations)
44 Minutes (current affairs magazine about Japan and Asia)
Worldwatch (the stories behind the international headlines)
Storytime (a children's program)

MONDAY

0500 R. Habana Cuba
R. Netherlands
0505 Deutsche Welle
0515 Deutsche Welle
WBCQ
0530 China R. Int.
WWCR(3210kHz)
WWCR(5070kHz)
0532 Voice of Russia
0540 R. Habana Cuba
0545 WBCQ
0550 R. Habana Cuba

Weekly Review (Cuba's perspective on current events)
Dutch Horizons (Bertine Krol chronicles life in Holland)
Religion and Society (an insight into religious events around the world)
Cool (Erica Gingerich and Anke Rasper present DW's youth magazine with reports on the attitudes, music and style of young Europe)
World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
People in the Know [refer to 0330 M]
Eco Watch (global ecological developments)
New Horizons (2001 NY International Radio Award winning program reporting on breakthrough discoveries in science, medicine and technology)
The Jazz Show (recordings from the Russian world of jazz)
The Mailbag Show (listener letters)
Radio D.C.
Breakthrough (Arnie Coro with a report on science)

TUESDAY-SATURDAY

0505 Deutsche Welle

Newslink (daily current affairs magazine focused on Europe)

TUESDAY

0500 R. Netherlands
0511 Voice of Russia
0530 China R. Int.
Deutsche Welle

The Research File (a magazine emphasizing the relevance of science to all our lives)
Moscow Mailbag [refer to 0311 S]
Biz China [refer to 0330 T]
Insight (a look at major international trends and developments)

WEDNESDAY

0500 R. Netherlands
0511 Voice of Russia
0530 Deutsche Welle
0532 Voice of Russia
0540 R. Habana Cuba

Music 52/15 (Martha Hawley presents musical styles from around the globe)
Science and Engineering (reports on the latest developments in science and technology)
Man and Environment (John Hay presents the human element in environmental issues)
Moscow Yesterday and Today (recalling the most interesting events in the history of the city)
DXers Unlimited (Arnie Coro presents a program for radio enthusiasts.)

THURSDAY

0500 R. Netherlands
0511 Voice of Russia
0530 Deutsche Welle
0532 Voice of Russia

The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
Newmarket (news about business in Russia and Russia's involvement in international business)
Living in Germany (people, places and events in Germany)
Folk Box (music drawn from the traditions of the hundreds of nationalities that make up Russia and the CIS)

FRIDAY

0500 R. Netherlands
0511 Voice of Russia
0530 China R. Int.
Deutsche Welle

HCB Ecuador

0532 Voice of Russia

SATURDAY

0500 BBCWS(am) R. Netherlands WBCQ(7415kHz)
0505 R. Australia R. New Zealand Int.
0510 R. Japan
0511 Voice of Russia
0515 WBCQ(7415kHz)
0520 China R. Int.
0530 BBCWS(am)
Deutsche Welle
HCB Ecuador
R. Australia
WHRA(7580kHz)
0532 Voice of Russia
0545 BBCWS(am)
R. Australia

The Sound Fountain [refer to 0030 M]
Moscow Mailbag [refer to 0311 S]
Life in China [refer to 0330 F]
Hard to Beat: The World of Sport (weekly report on German and European sport)
The Book and the Spade (the latest discoveries and developments in Biblical archaeology)
Audio Book Club (readings from the best of Russian classic and contemporary literature)
The World Today [refer to 0400 S]
A Good Life (how development affects societies)
Amos 'n Andy (the classic radio comedy from America's radio past)
Pacific Focus-Sport (the week's sports news as reported on the daily magazine 'Pacific Beat')
Tagata o te Moana (Anita Purcell presents a weekly Pacific magazine with NZ and regional Pacific news, issues, information and music)
Hello from Tokyo (listener letters, music and short features)
Science and Engineering [refer to 0511 W]
The Clone Zone (your guess is as good as mine—ed.)
Listeners' Garden [refer to 0320 A]
World Business Review (the week in global business and finance)
German by Radio (a language lesson)
Walkin' in the Sunshine (Ben Cummings with the roots of country music)
Lingua Franca (a program about language and its social, cultural and historical ramifications)
DXing with Cumbre (Marie Lamb with the hottest DX catches)
Timelines [refer to 0532 S]
Letter from America (Alistair Cooke's weekly essay about life in the USA)
Short Story (short pieces from Australian literature)

1100 UTC / 6am E / 3am P - Page 48 Freqs

DAILY

1100 BBCWS(am) World Briefing
1120 BBCWS(am) British News

SUNDAY

1100 R. New Zealand Int.
1105 R. Australia
1110 R. Japan
1130 R. Australia
BBCWS(am)
1135 R. Netherlands
1155 R. Netherlands

NZ Forces Programme (news, information and entertainment for NZ troops and personnel stationed in East Timor and Papua-New Guinea)
Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
Hello from Tokyo (listener letters, music and short features)
The Business Report (a weekly round-up of the latest business news and information from Australia and the world presented by Narelle Hooper)
Assignment [refer to 0330 M]
Wide Angle (a weekly in-depth look at a news topic)
The Week Ahead (a preview of what's on RN the next seven days)

MONDAY-FRIDAY

1100 R. New Zealand Int.
1105 BBCWS(am)
R. Australia
1110 BBCWS(am)
1115 BBCWS(am)
R. Japan
1130 BBCWS(am)
HCB Ecuador
R. Australia

Late Edition (RNZ National Radio's domestic late evening news magazine)
Caribbean Report (the latest news in the Caribbean)
Asia-Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)
Sports Caribbean
Caribbean Magazine (a current affairs and feature program focusing on life in the region)
Asian Top News (the day's major stories as reported by the region's radio stations)
World Business Report (the main business issues of the day)
Morning in the Mountains (the longstanding breakfast program from The Voice of the Andes with news, sports, prayer, friendly conversation and inspirational music)
Bush Telegraph (a daily magazine highlighting

R. Netherlands

MONDAY

1125 R. Japan

1145 BBCWS(am)

TUESDAY

1125 R. Japan

1145 BBCWS(am)

WEDNESDAY

1125 R. Japan

1145 BBCWS(am)

THURSDAY

1125 R. Japan

1145 BBCWS(am)

FRIDAY

1125 R. Japan

1145 BBCWS(am)

SATURDAY

1100 R. New Zealand Int.
1105 R. Australia
1110 R. Japan
1130 BBCWS(am)
R. Australia
1135 R. Netherlands
1145 BBCWS(am)
1155 R. Netherlands

NZ Forces Programme [refer to 1100 S]
Asia Pacific Weekend Edition (a weekly current events and business report)
Pop Joins the World [refer to 0510 S]
Analysis (background to a story in the news)
Fine Music Australia (Australian classical artists with Charles Southwood)
Europe Unzipped (a 'zippy' compilation of news and views from Europe)
Sports Round-up (all the daily sporting news worldwide)
Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

1200 UTC / 7am E / 4am P - Page 49 Freqs

DAILY

1200 BBCWS(am) Newshour (60 minutes of news and analysis from around the globe)

SUNDAY

1200 R. Netherlands
1205 R. Australia
R. New Zealand Int.
1230 R. Netherlands
R. Sweden

The Sound Fountain [refer to 0030 M]
Nocturne (Mairi Nicolson presents an artfully arranged selection of music from around the globe and across the centuries)
Sportsworld (excerpts and summaries of the weekend's sporting events)
Dutch Horizons (Bertine Krol chronicles life in Holland)
[refer to 0230 M] In Touch with Stockholm (1st week); Sounds Nordic (all other weeks)

MONDAY-FRIDAY

1200 HCB Ecuador
1205 BBCWS(am)
HCB Ecuador
1210 BBCWS(am)
HCB Ecuador
1230 HCB Ecuador
R. Sweden
1235 HCB Ecuador

Latin American and International News
Caribbean Business (a report on regional commerce and economics)
Sports Report
Caribbean Report (latest news in the Caribbean)
Morning in the Mountains (continues from 1130)
Latin American and International News
Sixty Degrees North (reports, interviews and analysis on the Nordic region)
Morning in the Mountains (continues from 1130)

MONDAY

1200 R. Netherlands
1205 R. Australia
1230 R. Netherlands

EuroQuest (a magazine placing Europe in context)
Late Night Live (Philip Adams interviews the major newsmakers, philosophers, artists and trendsetters in Australia and around the world)
The Research File (a magazine emphasizing the relevance of science to all our lives)

Shortwave Guide



1245 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY

1200 R. Netherlands A Good Life (how development affects societies)
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands Music 52-15 (Martha Hawley presents musical styles from around the globe)

1245 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY

1200 R. Netherlands Dutch Horizons [refer to 1230 S]
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)

1245 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY

1200 R. Netherlands The Research File [refer to 1230 M]
1205 R. Australia Late Night Live [refer to 1205 M]
1230 R. Netherlands The Sound Fountain [refer to 0030 M]
1245 R. Sweden [refer to 0245] F Nordic Report [1st week]; Greenscan [2nd week]; Heart Beat [3rd week]; The S-Files [4th week]

FRIDAY

1200 R. Netherlands The Weekly Documentary [refer to 1230 W]
1205 R. Australia Sound Quality (Tim Ritchie seeks out the interesting, the evolutionary, the inaccessible and the wonderful in music)

1230 R. Netherlands A Good Life (how development affects societies)
1245 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY

1200 R. Netherlands Dutch Classics (Helene Michaud with Dutch classical music)
R. New Zealand Int. NZ Forces Programme (continues from 1100)
1205 R. Australia The Spirit of Things (Dr. Rachael Kohn explores contemporary values and beliefs as expressed through ritual, art, music, and sacred texts)
WWCR(5070kHz.) Rock the Universe (Christian rock music)
1230 R. Netherlands Music 52-15 [refer to 1230 T]
R. Sweden [refer to 0230 S] Weekend (1st week); Sweden Today (2nd week); Spectrum (3rd week); Studio 49 (4th week)

1300 UTC / 8am E / 5am P - Page 49 Freqs

SUNDAY

1305 BBCWS(am) Composer of the Month [refer to 0205 S]
R. Australia Nocturne (continues from 1205)
R. Netherlands Sincerely Yours (RN's listener response program)
WWCR(12160kHz) Rock the Universe (Christian rock music)
1320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
1330 BBCWS(am) In Praise of God (diverse services of worship)
R. Sweden [refer to 0230 M] In Touch with Stockholm (1st week); Sounds Nordic (all other weeks)

MONDAY-FRIDAY

1300 R. Australia RA News (a fifteen minute report with emphasis on significant events in Asia and the Pacific region, and sports and business reports)
R. Netherlands Newsline (RN's flagship current affairs magazine)
1305 BBCWS(am) Outlook (topical magazine of people, places and events)
1310 R. Canada Int. The Current (Anna Maria Tremonti hosts a CBC domestic current affairs magazine)[joined in progress]
1320 R. Australia The Planet (Lucky Oceans with a rich mix of jazz, blues, folk styles, art music and more in a show artfully arranged for radio)
1330 R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)
1345 BBCWS(am) Off the Shelf (abridged serialized readings of novels, stories and other literature)

MONDAY

1330 China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
1345 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY

1330 China R. Int. Biz China (business and finance in the Chinese market)
1345 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY

1345 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY

1345 R. Sweden [refer to 0245] F Nordic Report [1st week]; Greenscan [2nd week]; Heart Beat [3rd week]; The S-Files [4th week]

FRIDAY

1330 China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
1345 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY

1300 WHRI(6040kHz.) DXing with Cumbre (Marie Lamb with the hottest DX catches)
1305 BBCWS(am) World Football (interviews, features, reports for global soccer fans)
R. Australia The Science Show (Robyn Williams presents one of the longest running programs on ABC Radio)
R. Netherlands Europe Unzipped [refer to 1135 A]
1320 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
1330 BBCWS(am) The Music Feature (documentary series on current popular music genres)
R. Sweden [refer to 0230 S] Weekend (1st week); Sweden Today (2nd week); Spectrum (3rd week); Studio 49 (4th week)
WHRI(9495kHz.) DXing with Cumbre (Marie Lamb with the hottest DX catches)

1400 UTC / 9am E / 6am P - Page 49 Freqs

DAILY

1400 R. Japan News (a round-up of Asian and world news)

SUNDAY

1400 WRMI Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
1405 BBCWS(am) Talking Point (global phone-in where listeners and internet users can share their views on the issues of the day and put questions to expert guests)
R. Australia Books and Writing (Ramona Koval conducts in-depth discussions focusing on books, ideas and writing)
1410 R. Canada Int. The Sunday Edition (a relaxed and reflective weekend current affairs, arts and ideas magazine hosted by Michael Enright)
R. Japan Pop Joins the World [refer to 0510 S]
1415 R. Prague Readings from Czech Literature
1420 China R. Int. In the Spotlight [refer to 1320 S]
1430 R. Sweden In Touch with Stockholm (an interactive listener contact program presented the first weekend of each month by Nidia Hagström); Sounds Nordic (R. Sweden's youth music and trends magazine, presented by Gaby Katz every weekend of the month but the first)
WWCR(15825kHz) The Old Record Shop (vintage recordings)
1435 R. Netherlands Sincerely Yours (RN's listener response program)
1455 R. Netherlands The Week Ahead (on RN the next seven days)

MONDAY-FRIDAY

1400 WWCR(15825kHz) World Wide Country Radio (country music)
1405 R. Australia The Planet (continues from 1315)
R. Canada Int. Sounds Like Canada (Shelagh Rogers hosts a lively mix of voices and song from all over the country)
1415 R. Japan 44 Minutes (current affairs magazine about Japan and Asia)
1430 R. Netherlands Newsline (RN's flagship current affairs magazine)
R. Sweden Sixty Degrees North (reports, interviews and analysis on the Nordic region)

MONDAY

1405 BBCWS(am) Meridian-Masterpiece (critical examinations of creative endeavors)
1430 BBCWS(am) Charlie Gillett (world music)
China R. Int. People in the Know [refer to 1330 M]

1445 R. Sweden Sports Scan (a weekly report on sports in the Nordic region)

TUESDAY

1405 BBCWS(am) Meridian-Screen (interviews, documentaries, features and discussions on the film arts)
1430 BBCWS(am) The UK Top Twenty (music from the British rock and pop charts)
China R. Int. Biz China [refer to 1330 T]
1445 R. Sweden Close Up (profiles of people in Sweden from all walks of life)

WEDNESDAY

1405 BBCWS(am) Meridian-Writing [refer to 0105 H]
1430 BBCWS(am) Revolver (musicians play their favorites among the new releases)
1445 R. Sweden Money Matters (a weekly economic report on the Nordic region)

THURSDAY

1405 BBCWS(am) The Music Biz (the global music business examined)
1430 BBCWS(am) John Peel (innovative and eclectic pop music)
1445 R. Sweden [refer to 0245] F Nordic Report [1st week]; Greenscan [2nd week]; Heart Beat [3rd week]; The S-Files [4th week]

FRIDAY

1405 BBCWS(am) Arts in Action (a global arts magazine)
1430 BBCWS(am) Jazzmatazz (global jazz magazine)
China R. Int. Life in China [refer to 1330 F]
1445 R. Sweden A Report on the Nordic Newsweek (the week's main news stories)

SATURDAY

1405 BBCWS(am) Sportsworld (live commentary on major sports events and fixtures, reports and results from around Britain and Europe, and news of all the day's sporting action from around the world)
R. Australia New Dimensions (intimate conversations with many of this century's leading thinkers and social innovators)
R. Prague Insight Central Europe [refer to 0105 S]
1410 R. Canada Int. The House (a review of the week in Canadian national politics)
R. Japan Weekend Square (aspects of Japan with interviews, music)
1420 China R. Int. Listeners' Garden [refer to 1320 A]
1430 R. Sweden [refer to 0230 S] Weekend (1st week); Sweden Today (2nd week); Spectrum (3rd week); Studio 49 (4th week)
1435 R. Netherlands Europe Unzipped (a 'zippy' compilation of news and views from Europe)
1455 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

1500 UTC / 10am E / 7am P - Page 50 Freqs

SUNDAY

1500 R. Netherlands Dutch Horizons (Bertine Krol chronicles life in Holland)
1505 BBCWS(am) From Our Own Correspondent (the background to international events from BBC correspondents around the world)
R. Australia Encounter (a series exploring the religious experience of multicultural Australia)
1505 R. Canada Int. The Sunday Edition (continues from 1410)
1520 China R. Int. In the Spotlight [refer to 1320 S]
1530 BBCWS(am) People and Politics (inside British politics)
R. Netherlands The Sound Fountain [refer to 0030 M]

MONDAY-FRIDAY

1505 R. Australia Asia Pacific (Radio Australia's flagship current events and business report for and about Asia and the Pacific region)

MONDAY

1500 R. Netherlands The Research File (a magazine emphasizing the relevance of science to all our lives)
1505 BBCWS(am) One Planet (stories about the environment, development, agriculture and human impact on the natural world)
R. Canada Int. Workology (Jane Farrow looks at the how, where and why we scratch out a living)
1530 BBCWS(am) Documentaries (social, cultural and political fea-

Shortwave Guide



China R. Int.
R. Australia

R. Netherlands

TUESDAY

1500 R. Netherlands
1505 BBCWS(am)

R. Canada Int.

1520 R. Canada Int.
1530 BBCWS(am)

China R. Int.
R. Australia

R. Netherlands

WEDNESDAY

1500 R. Netherlands
1505 BBCWS(am)

R. Canada Int.
1520 R. Canada Int.
1530 R. Australia

1530 BBCWS(am)

R. Netherlands
R. Canada Int.

THURSDAY

1500 R. Netherlands
1505 BBCWS(am)

R. Canada Int.
1520 R. Canada Int.
1530 BBCWS(am)

R. Australia
R. Netherlands

FRIDAY

1500 R. Netherlands
1505 BBCWS(am)

R. Canada Int.
1520 R. Canada Int.
1530 BBCWS(am)

China R. Int.
R. Australia

R. Netherlands

SATURDAY

1500 R. Netherlands
1505 BBCWS(am)
R. Australia
R. Canada Int.

1520 China R. Int.
1530 R. Netherlands

1600 UTC / 11am E / 8am P - Page 50 Freqs

DAILY

1630 R. Austria Int. Report from Austria (a daily magazine focusing on Austria and central and eastern Europe)

SUNDAY

1600 KWHR(9930kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
1601 BBCWS(am) Concert Hall (classical music recitals and performances)
1605 R. Australia The National Interest (Terry Lane's round-up of the week's major issues)

tures and series)
People in the Know [refer to 1330 M]
The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
EuroQuest (a magazine placing Europe in context)

Music 52-15 (Martha Hawley presents musical styles from around the globe)
Science in Action (Richard Black reports on science and technology)
Out Front (a place for new ideas, new ways of making radio and new voices from across Canada)
Sounds Like Canada (continues from 1405)
Documentaries (social, cultural and political features and series)
Biz China [refer to 1330 T]
The Law Report (Damien Carrick presents breaking legal stories in Australia and overseas.)
A Good Life (how development affects societies)

The Weekly Documentary (RN's award-winning sound essays and in-depth investigations)
Health Matters (reports on the latest medical research)
Out Front [refer to 1505 T]
Sounds Like Canada (continues from 1405)
The Religion Report (Stephen Crittenden examines the way religion and societies interact)
Everywoman (an international magazine for women)
Dutch Horizons [refer to 1500 S]
C'est La Vie (Bernard St.-Laurent presents a program about life in Quebec and French-speaking Canada)

The Sound Fountain [refer to 0030 M]
Go Digital (technology journalist Tracey Logan explains the latest in IT)
Out Front [refer to 1505 T]
Sounds Like Canada (continues from 1405)
Focus on Faith (Trevor Barnes looks at the religious stories behind the news)
The Media Report [refer to 0130 H]
The Research File [refer to 1500 M]

A Good Life [refer to 1530 T]
Discovery (in-depth exploration of science and technology topics)
Out Front [refer to 1505 T]
Sounds Like Canada (continues from 1405)
Sports International (the issues and personalities behind the headlines)
Life in China [refer to 1330 F]
The Sports Factor (Amanda Smith debates and celebrates the cultural significance of sport)
The Weekly Documentary [refer to 1500 W]

Music 52-15 [refer to 1500 T]
Sportsworld (continues from 1405)
Nocturne [refer to 1205 S]
The Vinyl Cafe (Canadian humorist Stuart McLean with music and tales centered around a mythical record store)
Listeners' Garden [refer to 1320 A]
Dutch Classics (Helene Michaud with Dutch classical music)

R. Canada Int.
R. Netherlands

1635 R. Austria Int.

MONDAY-FRIDAY

1600 BBCWS(am)
R. Netherlands
1620 BBCWS(am)
1645 BBCWS(am)

MONDAY

1605 R. Australia

1630 BBCWS(am)

TUESDAY

1605 R. Australia

1630 BBCWS(am)

WEDNESDAY

1605 R. Australia

1630 R. Australia

1630 BBCWS(am)

THURSDAY

1605 R. Australia

1630 BBCWS(am)

FRIDAY

1605 R. Australia
1630 BBCWS(am)

SATURDAY

1605 BBCWS(am)
R. Australia
R. Canada Int.

R. Netherlands
1635 R. Austria Int.

1700 UTC / 12pm E / 9am P - Page 51 Freqs

DAILY

1700 R. Japan News (a round-up of Asian and world news)

SUNDAY

1705 R. Australia New Dimensions [refer to 1405 A]
1710 R. Japan Pop Joins the World [refer to 0510 S]
1730 VOA Africa Music Time in Africa (Rita Rochelle highlights the best of traditional and modern African music)[broadcast in two editions with part two airing at 1930]

MONDAY-FRIDAY

1705 R. Australia

VOA News Now

1715 R. Japan

Bush Telegraph (a daily magazine highlighting rural and regional issues)
Talk to America (Carol Pearson hosts a worldwide call-in show featuring American decisionmakers, personalities and experts)
44 Minutes (current affairs magazine about Japan and Asia)

SATURDAY

1705 R. Australia The Spirit of Things [refer to 1205 A]
1710 R. Japan Hello from Tokyo (listener letters, music and short features)

2100 UTC / 4pm E / 1pm P - Page 53 Freqs

DAILY

2100 R. Japan News (a round-up of Asian and world news)

The Sunday Edition (continues from 1410)
Wide Angle (a weekly in-depth look at a news topic)
Insight Central Europe [refer to 0105 S]

World Briefing
Newsline (RN's flagship current affairs magazine)
British News
Sports Roundup (all the daily sporting news worldwide)

Margaret Throsby (a guest is interviewed and presents favorite musical pieces)
Analysis (background to a story in the news)

The Comfort Zone (Alan Saunders presents a unique program that debates and celebrates the cultural significance of architecture and design, landscape and gardens, and food)
Analysis (background to a story in the news)

Verbatim (the story of the 20th century through the voices of ordinary Australians)
Earshot (a half-hour feature from the footpaths, paddocks, lounge rooms and shopping malls of the diverse Australian continent)
From Our Own Correspondent [refer to 1505 S]

Hindsight (Australian social history through institutions, popular culture, health, environment, etc)
Analysis (background to a story in the news)

Away! (Aboriginal arts, culture, social and political issues)
Analysis (background to a story in the news)

Sportsworld (continues from 1405)
Nocturne (continues from 1505)
Quirks and Quarks (Bob McDonald with what's new and next in science)
Europe Unzipped [refer to 1435 A]
Network Europe (a weekly magazine on Europe)

SUNDAY

2100 BBCWS(am)

WBCQ(7415kHz.)

2105 WWC(15825kHz.)
VOA News Now

2110 R. Australia

R. Canada Int.

R. Japan
2130 R. Australia

2135 R. Canada Int.

MONDAY-FRIDAY

2110 R. Canada Int.

MONDAY

2105 BBCWS(am)
VOA News Now

2110 R. Australia

2125 R. Japan

2130 BBCWS(am)
R. Australia

2135 R. Canada Int.

TUESDAY-SATURDAY

2115 R. Japan

TUESDAY

2105 BBCWS(am)
VOA News Now
2110 R. Australia

2125 R. Japan

2130 BBCWS(am)
R. Australia

2135 R. Canada Int.

WEDNESDAY

2105 BBCWS(am)
VOA News Now

2110 R. Australia

2125 R. Japan
2130 BBCWS(am)
R. Australia

2135 R. Canada Int.

THURSDAY

2100 WBCQ(7415kHz.)

2105 BBCWS(am)
VOA News Now

2110 R. Australia

2125 R. Japan
2130 BBCWS(am)
R. Australia

WWCR(9475kHz)

2135 R. Canada Int.

Newshour (60 minutes of news and analysis from around the globe)
Radio Caroline ("Europe's first and only album station")
Eco Watch (global ecological developments)
Jazz America (the best of jazz, past and present, with Russ Davis)
AM (ABC Radio's flagship morning news magazine)
The Maple Leaf Mailbag (Ian Jones answers listener mail and hosts the fortnightly CIDX Report for dxers)
Pop Joins the World [refer to 0510 S]
Educational series (a series of documentary programs dealing with Asian or Pacific history, politics or communications. Specific details were unavailable at deadline.)
Spotlight (a magazine touching on all facets of artistic and cultural life in Canada)

Canada Today [refer to 0210 T-A]

Science in Action [refer to 1505 T]
American Gold (pop music classics with Ray Freeman)
AM (ABC Radio's flagship morning news magazine)
Japan Music Log (songs rooted in the lifestyles of each region of Japan, introducing the local traditions, history and culture)
Documentaries [refer to 1530 T]
The Health Report (Dr. Norman Swan's weekly report on health and medical issues)
Media Zone (Ian Jones hosts forum with Canadian journalists on issues facing Canadians)

Asian Top News (the day's major stories as reported by the region's radio stations)

Health Matters [refer to 1505 W]
Roots and Branches (Katherine Cole with roots music)
AM (ABC Radio's flagship morning news magazine)
Let's Learn Japanese (a Japanese language lesson for beginners)
Everywoman [refer to 1530 W]
Innovations (showcasing Australian invention, enterprise and ingenuity)
Spotlight [refer to 2135 S]

Go Digital [refer to 1505 H]
Classic Rock (Ed Kowalski and Margot Braswell play classic rock tracks)
AM (ABC Radio's flagship morning news magazine)
Japanese Musical Treasure Box
Omnibus [refer to 1530 H]
The Religion Report (Stephen Crittenden examines the way religion and societies interact)
The Maple Leaf Mailbag [refer to 2110 S]

Radio Caroline ("Europe's first and only album station")
Discovery [refer to 1505 F]
Top 20 Countdown (Ray McDonald surveys hit music in the USA)
AM (ABC Radio's flagship morning news magazine)
Brush Up Your Japanese (an intermediate course in Japanese)
Sports International [refer to 1530 F]
Rural Reporter (news and stories from rural and regional Australia)
World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
Business Sense (an in-depth look at Canadian companies in the global economy)

Shortwave Guide



FRIDAY
2100 WBCQ(7415kHz) Radio Caroline ("Europe's first and only album station")
2105 BBCWS(am) One Planet [refer to 1505 M]
R. Australia Feedback [refer to 0005 A]
VOA News Now Country Hits USA (Mary Morningstar with country music)
2125 R. Japan Music Beat (contemporary Japanese popular music)
2130 BBCWS(am) Documentaries [refer to 1530 M]
R. Australia Oz Sounds (Australian new music releases)
2135 R. Canada Int. Canada in the World (Wojtek Gwiazda hosts magazine examining Canadian policies, priorities and international relations)

SATURDAY
2100 BBCWS(am) Newshour (60 min. of news and analysis from around the globe)
WBCQ(7415kHz) Radio Caroline ("Europe's first and only album station")
2105 R. Australia Australia All Over (Ian McNamara—aka "Macca"—hosts this celebration of Australian and traditional Australian customs and values)[begins at 1900]
VOA News Now Jazz America [refer to 2105 S]
2105 R. Prague Readings from Czech Literature
2110 R. Canada Int. Business Sense [refer 2135 H]
R. Prague SATURDAY Music (Czech classical, folk, jazz or rock music)
R. Japan Weekend Square (aspects of Japan with interviews, music)
2130 WWCRC(15825kHz) Presidential Radio Address and the Democratic Party Response
2135 R. Canada Int. Canada in the World [refer to 2135 F]

2200 UTC / 5pm E / 2pm P - Page 53 Freqs

SUNDAY
2200 BBCWS(am) The World Today (the BBC's agenda-setting flagship global news program)
WBCQ(7415kHz) Radio Free Euphoria (freeform radio)
WHRI(5745kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
WRMI Wavescan (a weekly program from Adventist World Radio for shortwave radio enthusiasts)
2205 R. Canada Int. Canada in the World [refer to 2135 F]
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2230 BBCWS (am) Agenda (ideas and trends shaping our world)
2230 R. Belgium Radio World (Frans Vossen presents a weekly report about international radio)
2240 R. Australia The Australian Music Show (the latest rock music from the Triple J youth network of the ABC)
2245 R. Prague Readings from Czech Literature

MONDAY-FRIDAY
2200 R. Canada Int. The World at Six [refer to 2300 M-F]
2205 BBCWS(am) World Business Report
2220 BBCWS(am) British News
2230 BBCWS(am) Sports Roundup (all the daily sporting news worldwide)

MONDAY
2200 WBCQ(7415kHz) Jean Shepherd (the noted humorist's classic radio programs from the 60s and 70s)
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Music Deli (Australian performances of folk, acoustic, traditional and world music)
2245 BBCWS(am) Analysis (background to a story in the news)

TUESDAY
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Blacktracker (Mal Holness presents contemporary Aboriginal music)
2245 BBCWS(am) Analysis (background to a story in the news)

WEDNESDAY
2200 WBCQ(7415kHz) The Clone Zone (ed. note: your guess is as good as mine!)
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Oz Country Style (country music from Australia)

2245 BBCWS(am) From Our Own Correspondent (the background to the news from BBC correspondents around the world)

THURSDAY
2210 R. Australia AM (ABC Radio's flagship morning news magazine)
2240 R. Australia Jazz Notes (Australian jazz presented by Ivan Lloyd)
2245 BBCWS(am) Analysis (background to a story in the news)

FRIDAY
2200 WBCQ(7415kHz) Pan Global Wireless
WHRA(17650kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2205 R. Australia Asia-Pacific Weekend Edition (reports and analysis on the region's events over the past week)
2230 R. Australia AM Saturday (the domestic ABC's Saturday morning news magazine)
WBCQ(7415kHz) Pab Sungenis Project (stand-up comedy and sketches)
2245 BBCWS(am) Analysis (background to a story in the news)

SATURDAY
2200 BBCWS(am) The World Today [refer to 2200 S]
WBCQ(7415kHz) HarvZower (a personal selection of contemporary music)
2205 R. Australia Correspondents Report (The ABC's overseas reporters give their interpretation and analysis of the week's major events)
R. Canada Int. Media Zone [refer to 2135 M]
2230 BBCWS(am) From Our Own Correspondent [refer to 2245 W]
R. Australia The Business Report (a weekly round-up of news and information presented by Rachel Mealey)
RVi Belgium Music from Flanders (a half-hour of Flemish music, musicians and musical performances)
WHRA(17650kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
Insight Central Europe [refer to 0105 S]
2235 R. Prague

2300 UTC / 6pm E / 3pm P - Page 54 Freqs

DAILY
2300 BBCWS(am) The World Today [refer to 2200 S]
SUNDAY-THURSDAY
2300 R. New Zealand Int. Midday Report (news updates and in-depth reports)

SUNDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
2310 R. Australia Asia Pacific (Radio Australia's flagship current events and business report)
2315 WWCRC(9475kHz) New Horizons (2001 NY International Radio Award winning program reporting on breakthrough discoveries in science, medicine and technology)
2320 China R. Int. In the Spotlight (Chinese arts and cultural magazine)
2330 R. Australia Earthbeat (Alexandra DeBlas presents a program on environmental science)
R. Canada Int. The Inside Track (anthologies and documentaries about sports and competitors)
2335 R. Netherlands Sincerely Yours (RN's listener response program)
2345 R. Prague Readings from Czech Literature
2355 R. Netherlands The Week Ahead (a preview of what's on RN the next seven days)

MONDAY-FRIDAY
2300 R. Canada Int. The World at Six (the CBC's flagship evening newscast)
2330 R. Netherlands Newsline (RN's flagship current affairs magazine)
R. Canada Int. As It Happens (Barbara Budd and Mary Lou Finley interview people eyewitnessing news in the making)

MONDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 China R. Int. People in the Know (interviews with prominent Chinese who are shaping the nation's future)
R. Australia The Buzz (the week's big technology news and issues presented by Richard Aedy)

TUESDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 China R. Int. Biz China (business and finance in the Chinese market)

R. Australia RA Arts (Julie Copeland presents the world of arts and cultural ideas)

WEDNESDAY
2300 WBCQ World of Radio (Glenn Hauser's comprehensive review of the week in shortwave and international broadcasting)
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 R. Australia Rural Reporter (news and stories from rural and regional Australia)

THURSDAY
2310 R. Australia Asia Pacific [refer to 2310 S]
2330 R. Australia The Media Report [refer to 0130 H]
WBCQ(7415kHz) Uncle Ed's Musical Memories

FRIDAY
2305 R. Australia Lingua Franca (a program about language and its social, cultural and historical ramifications)
2310 R. New Zealand Int. Focus on Politics (a report on government and politics in NZ)
2330 BBCWS(am) Global Business (Peter Day on transformations in the world of work and commerce)
China R. Int. Life in China (a weekly magazine focusing on the lives of ordinary people in China)
R. Australia The Sports Factor (Amanda Smith debates the cultural significance of sport)
R. New Zealand Int. The Sampler (Nick Bollinger casts a critical ear over the latest CD offerings)
WBCQ(7415kHz) WDCD

SATURDAY
2300 R. Canada Int. The World This Weekend (CBC weekend news magazine)
WBCQ(7415kHz) Radio Timtron Worldwide
2305 R. Australia Ockham's Razor (sharp commentaries on scientific issues)
2310 R. New Zealand Int. The Week in Parliament (a weekly roundup of NZ political news)
2320 China R. Int. Listeners' Garden (letters, touring, cooking and a language lesson)
2330 BBCWS(am) Pick of the World (Daire Brehan presents World Service highlights and talks with the producers and presenters of BBC programs)
R. Australia Innovations (a program showcasing Australian invention, enterprise and ingenuity)
R. Canada Int. Madly Off in All Directions (Lorne Elliott travels across Canada to capture the country's unique senses of humor)
R. New Zealand Int. Spectrum (a weekly look at the people, places and events around NZ)
WRMI Wavescan (a weekly program from Adventist World Radio for DXers and shortwave radio enthusiasts)
WHRI(9495kHz) DXing with Cumbre (Marie Lamb with the hottest DX catches)
2335 R. Netherlands Europe Unzipped (a 'zippy' compilation of news and views from Europe)
2340 R. Prague Saturday Music (Czech classical, folk, jazz or rock music)
2355 R. Netherlands Insight (Rob Green casts a critical and humorous eye on the past week's headlines)

Thank You ...

Additional Contributors to This Month's Shortwave Guide:

Harold Frodge, Midland, MI; Glenn Hauser, Enid, OK; Adrian Sainsbury, RZ Intl; Harold Sellers, *BBC On Air*; *BCL News*; *BCDXC*; *Cumbre DX*; *DXA*; *DX Listening Digest*; *DX Ontario*; *Fineware*; *Hard Core DX*; *HFCC*; *ILG*; *NASWA*; *RFPI*; *World of Radio*; *Worldwide DX Club*.

Great Progress and More to Come

This year has been remarkable for the weather satellite (WXSAT) community: five new craft were launched; one Chinese, one American, one Japanese, one Indian and one European. First off was the polar orbiting Chinese Fengyun-1D, from which I received an early image on May 17, following its launch just two days earlier. Had it not been for the launch information provided to one of the satellite mailing lists on the Internet, it would have been some time before I could have "tuned in."

This satellite does not transmit APT – the low resolution telemetry data that requires relatively inexpensive equipment for its reception. Interestingly, the first in this series did carry an APT transmitter, and (somewhere!) I still have some images from it – more than a decade before I bought an HRPT (high resolution) system.

◆ GOES-12 to replace GOES-8 next March

NOAA has published a planned transition from GOES-8 to GOES-12 as the operational GOES-East spacecraft on March 31, 2003. This geostationary WXSAT was launched April 13, 1994, and has provided weather data for an extended period of time. The transition is partly due to limitations of the fuel required to keep GOES-8 within north/south inclination specifications.

There are significant differences on GOES-12 as compared to GOES-8 through GOES-11. The 6.7 micron water vapor channel resolution improves from 8km to 4km, and the 12.0 micron band resolution at 4km is replaced with 13.3 micron band at 8km.

The sequence:

GOES-12 comes out of on-orbit storage on January 9, 2003 and begins an eastward drift of 0.4° per day on 17 January from 110° West towards 75° West. Location updates will be provided via email and posted on <http://www.ssd.noaa.gov/PS/SATS/messages.html>

The Solar X-Ray Imager will be powered on and begin imaging on January 20. Imagery will be provided from January 24 through March 31 for advanced users, such as the Satellite Services Division, to acquire data and revalidate products; schedules during this time will be continuous, half-hourly, full discs. Affected products from the National Environmental Satellite, Data and Information Service (NESDIS) will be revalidated during this time.

When GOES-12 reaches 81° West, GOES-12 data will be flowed through GOES-8 communication links. GOES-12 data is then operational,

but received through GOES-8 downlink from March 31. Users will point antennas to GOES-8 and will receive GOES-12 data. At this point GOES-12 data are considered operational, but NOAA points out that should significant problems occur, GOES-8 data can be re-established quickly.

When GOES-12 arrives within 1 degree of GOES-8, the GOES-8 signal will be terminated, and GOES-12 data will be directly acquired from GOES-12.

Users should not therefore need to repoint their antenna, as the two satellites will be very close. Ancillary communication services (DCS, WEFAX, EMWIN, SAR) will be switched from GOES-8 to GOES-12 on April 22.

Additional information can be found at: <http://www.osd.noaa.gov/Gvar/gvardownload.htm> (Yes, I plan to describe those various initials in some detail at a later time!)

◆ Correspondence

I welcome letters or e-mails concerning WXSATs, but recently I had to refer two correspondents back because their queries concerned satellite television (handled by Ken Reitz). *MT* covers a good range of monitoring topics – but my own field is rather narrow!

Patrick A. Lunney of Technology Service Corporation (Colorado) sent me an image of hurricane Lili – see figure 1 – received on October 2. Their Geographic Information Systems (GIS) section operates a RealTime (RTGIS) system receiving telemetry from the NOAA WXSATs, comprising a Quorum receiver and antenna controller cards, with built-in DMSP, GOES-WEFAX, and Meteosat capability. They use a standard Quorum 4-foot receiver dish (and mesh antenna) on top of the Quorum positioner (fixed pole installa-

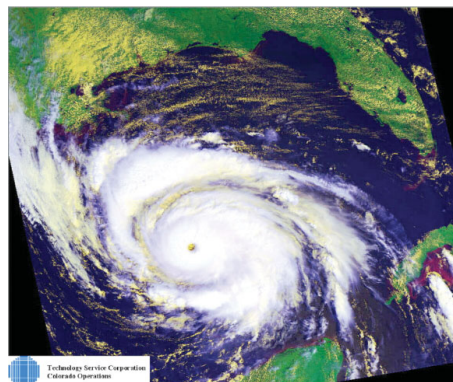


Fig 1: NOAA-17 image of hurricane Lili on 2 October from Patrick Lunney



Fig 2: RTGIS antennas – from Patrick Lunney
tion and tripod).

DMSP is the Defense Meteorological Satellite Program that uses satellites comparable with the NOAA WXSATs, though using encrypted telemetry. Patrick tells me that their software package is called *RTGIS* and, although built for Sun/Unix systems, they also have a variant for Windows. Mission planning, capture, and processing (including image registration, area of interest extraction, cloud analysis and image enhancement) is all done through *ERDAS Imagine* software. The system was originally developed for US Air Force use during the Bosnia conflict as a commercial off-the-shelf system for the Air Operations Center in Vicenza, Italy.

The company has sold a number of systems to other Department of Defense users and some to universities. Patrick feels that the strong point of RTGIS is that it handles the data in a GIS framework and retains the information in the spectral bands instead of just producing a picture or "flat file."

Their web page shows other items of interest on RTGIS at:

http://www.tsc.com/gis/_4SatelliteMod.htm

Frequencies

APT

NOAA-12 and NOAA-15 on 137.50 MHz (except during VHF conflict)
NOAA-17 on 137.62 MHz
Meteor 3-5 usually on 137.30 MHz when in sunlight.
Meteor 2-21 sometimes on 137.40 MHz when Meteor 3-5 is off.

HRPT

NOAA-12 and NOAA-16 on 1698.0 MHz
NOAA-14 (faulty) and NOAA-17 on 1707 MHz
NOAA-15 on 1702.5 MHz
Fengyun-1C and -1D on 1700.4 MHz

WEFAX

GOES-8 and GOES-10 use 1691 MHz

Satellite Service Guide



Robert Smathers
robertsmathers@monitoringtimes.com
www.monitoringtimes.com/mtssg.html

All Frequencies MHz

Satélites Mexicanos Solidaridad 2

C-Band - 113 degrees West longitude

1N(V)	3720	PCTV - Television Por Cable (digital)
1W/L(H)	3740	Data Transmissions
2N(V)	3760	Data Transmissions / XEWH-TV, Hermosillo (digital) / Radio Sonora (digital)
1W/U(H)	3780	Data Transmissions / TeleMichoacan (digital) / Radio Michoacan (digital)
3N(V)	3800	Edusat (digital)
2W/L(H)	3820	Data Transmissions
4N(V)	3840	Data Transmissions / TV Mas (digital) / Radio Mas (digital) / Television Tabasqueña (digital)
2W/U(H)	3860	Data Transmissions / RGT (digital) / Television Mexiquense (digital) / Radio Mexiquense (digital)
5N(V)	3880	(none)
3W/L(H)	3900	Data Transmissions / Canal 9 Oaxaca (digital) / XEOAX-AM, Oaxaca (digital)
6N(V)	3920	Data Transmissions / Canal 7 Quintana Roo (digital)
3W/U(H)	3940	Data Transmissions / XHIMT Canal 7 - TV Azteca (digital) / XHDF Canal 13 - TV Azteca (digital)
7N(H)	3960	(none)
4W/L(H)	3980	Data Transmissions
8N(V)	4000	(none)
4W/U(H)	4020	Data Transmissions
9N(V)	4040	MVS Television Empresarial (digital)
5W/L(H)	4060	Data Transmissions
10N(V)	4080	Data Transmissions
5W/U(H)	4100	Data Transmissions / XHRCG-TV, Coahuila (digital)
11N(V)	4120	(none)
6W/L(U)	4140	(none)
12N(V)	4160	Data Transmissions
6W/U(H)	4180	Data Transmissions / Hidalgo TV (digital) / Radio Hidalgo (digital) / TV Nuevo Leon (digital) / Occasional video (digital)

Satélites Mexicanos Solidaridad 2

Ku-band - 113 degrees West longitude

T01(H)	11730	(none)
T02(H)	11791	(none)
T03(H)	11852	(none)
T04(H)	11913	(none)
T05(H)	11974	Data Transmissions
T06(H)	12035	(none)
T07(H)	12096	Data Transmissions
T08(H)	12157	(none)
T09(V)	11743	(none)
T10(V)	11804	(none)
T11(V)	11865	(none)
T12(V)	11926	(none)
T13(V)	11987	(none)
T14(V)	12048	Data Transmissions
T15(V)	12109	(none)
T16(V)	12170	(none)

Satélites Mexicanos SATMEX-5

C-band - 116.8 degrees West longitude

1(V)	3720	Data Transmissions
2(H)	3740	Data Transmissions
3(V)	3760	Data Transmissions
4(H)	3780	Data Transmissions

5(V)	3800	PCTV - Television Por Cable (digital)
6(H)	3820	Data Transmissions
7(V)	3840	PCTV - Television Por Cable (digital)
8(H)	3860	Data Transmissions
9(V)	3880	Data Transmissions
10(H)	3900	Data Transmissions
11(V)	3920	Occasional video
12(H)	3940	Occasional video
13(V)	3960	Data Transmissions
14(H)	3980	Data Transmissions
15(V)	4000	Data Transmissions
16(H)	4020	Data Transmissions
17(V)	4040	Data Transmissions / XHAW-TV Monterrey (digital) / XHSAW-TV TeleRitmo, Monterrey (digital)
18(H)	4060	Canal del Congreso (digital) / Mexican Government special feeds (digital) / XEIPN-TV Canal Once (digital)
19(V)	4080	Data Transmissions
20(H)	4100	Data Transmissions / GuateVision (digital) / Radio Cien Guatemala (digital)
21(V)	4120	MVS Television Empresarial (digital)
22(H)	4140	Data Transmissions
23(V)	4160	PCTV - Television Por Cable (digital)
24(H)	4180	Edusat (digital)

Satélites Mexicanos SATMEX-5

Ku-Band - 116.8 degrees West longitude

1(H)	11720	Data Transmissions
2(V)	11740	(none)
3(H)	11760	Data Transmissions
4(V)	11780	Data Transmissions
5(H)	11800	(none)
6(V)	11820	Data Transmissions
7(H)	11840	(none)
8(V)	11860	Data Transmissions
9(H)	11880	(none)
10(V)	11900	Data Transmissions
11(H)	11920	Data Transmissions
12(V)	11940	Data Transmissions
13(H)	11960	Data Transmissions
14(V)	11980	Data Transmissions
15(H)	12000	Data Transmissions
16(V)	12020	Data Transmissions
17(H)	12040	Data Transmissions
18(V)	12060	Data Transmissions
19(H)	12080	TV Polonia / PTV / Tzu Chi / CCTV / Mac TV / ATV (digital)
20(V)	12100	Data Transmissions
21(H)	12120	Data Transmissions
22(V)	12140	Data Transmissions
23(H)	12160	Data Transmissions
24(V)	12180	Sistema Tecnológico de Monterrey - Campus Estado de Mexico (digital) / Universidad Virtual Empresarial - Sistema Tecnológico de Monterrey (digital)

Telesat Canada Anik E1

C-Band - 118.7 degrees West longitude

1A(H)	3720	(Inactive)
1B(V)	3740	(Inactive)
2A(H)	3760	(Inactive)
2B(V)	3780	(Inactive)
3A(H)	3800	(Inactive)
3B(V)	3820	(Inactive)
4A(H)	3840	(Inactive)

4B(V)	3860	(Inactive)
5A(H)	3880	(Inactive)
5B(V)	3900	(Inactive)
6A(H)	3920	(Inactive)
6B(V)	3940	(Inactive)
7A(H)	3960	(Inactive)
7B(V)	3980	America One
8A(H)	4000	(Inactive)
8B(V)	4020	(Inactive)
9A(H)	4040	Virginia Educational Satellite Network (occasional)
9B(V)	4060	(Inactive)
10A(H)	4080	Virginia Educational Satellite Network (occasional)
10B(V)	4100	(Inactive)
11A(H)	4120	(Inactive)
11B(V)	4140	(Inactive)
12A(H)	4160	Virginia Educational Satellite Network (occasional)
12B(V)	4180	(Inactive)

Telesat Canada Anik E1

Ku-Band - 118.7 degrees West longitude

T01(V)	11717	KTEL-TV, Carlsbad, NM (digital) / Equity Broadcasting (digital)
T02(V)	11743	(none)
T03(V)	11778	(Inactive)
T04(V)	11804	(Inactive)
T05(V)	11839	Equity Broadcasting (digital)
T06(V)	11865	(none)
T07(V)	11900	(none)
T08(V)	11926	(none)
T09(V)	11961	(Inactive)
T10(V)	11987	(Inactive)
T11(V)	12022	(Inactive)
T12(V)	12048	(Inactive)
T13(V)	12083	(Inactive)
T14(V)	12109	(Inactive)
T15(V)	12144	(Inactive)
T16(V)	12170	(Inactive)
T17(H)	11730	(Inactive)
T18(H)	11756	(Inactive)
T19(H)	11791	Occasional video
T20(H)	11817	Equity Broadcasting (digital)
T21(H)	11852	(Inactive)
T22(H)	11878	(Inactive)
T23(H)	11913	(Inactive)
T24(H)	11939	(Inactive)
T25(H)	11974	Equity Broadcasting (digital)
T26(H)	12000	Equity Broadcasting (digital)
T27(H)	12035	(Inactive)
T28(H)	12061	(Inactive)
T29(H)	12096	Occasional video
T30(H)	12122	(Inactive)
T31(H)	12157	(Inactive)
T32(H)	12183	(Inactive)

Panamsat Galaxy 10R

C-Band - 123 degrees West longitude

1(V)	3720	Data Transmissions
2(H)	3740	Data Transmissions
3(V)	3760	Data Transmissions
4(H)	3780	Data Transmissions
5(V)	3800	Showtime / The Movie Channel / Flx / Sundance - West (digital) / Showtime and The Movie Channel - Mountain (digital)
6(H)	3820	Data Transmissions
7(V)	3840	TVN Entertainment (digital)
8(H)	3860	Data Transmissions
9(V)	3880	TVN Entertainment / 4DTV Down-load Channel (digital)
10(H)	3900	Data Transmissions
11(V)	3920	Toon Disney / Soapnet (digital)

12(H)	3940	TVN Entertainment (digital)
13(V)	3960	TVN Entertainment / DMX Audio / Cable Radio Network 1-6 (digital)
14(H)	3980	Showtime HDTV - West (digital)
15(V)	4000	Showtime - West (VC2 +)
16(H)	4020	TV Land - East (VC2 +)
17(V)	4040	Nickelodeon - West (VC2 +)
18(H)	4060	The Movie Channel - West (VC2 +)
19(V)	4080	MTV - West (VC2 +)
20(H)	4100	Data Transmissions
21(V)	4120	ESPN News (VC2 +)
22(H)	4140	(none)
23(V)	4160	A&E - West (VC2 +)
24(H)	4180	Outdoor Channel (digital)

Panamsat Galaxy 10R

Ku-Band - 123 degrees West longitude

1(V)	11720	TARBS (Television and Radio Broadcasting Services) World TV (digital)
2(H)	11740	Veterans Administration private television network (digital)
3(V)	11760	Data Transmissions
4(H)	11780	Data Transmissions / Wal-Mart and Sam's Club In-Store analog SCPC Audio
	1012.75	87.25 Wal-Mart In-store Network
	1013.15	86.85 Sam's Club In-store Network
	1013.50	86.50 Wal-Mart In-store Network
	1013.95	86.05 Wal-Mart In-store Network
	1014.25	85.75 Sam's Club In-store Network
	1014.75	85.25 Wal-Mart In-store Network
	1015.05	84.95 Wal-Mart In-store Network
5(V)	11800	Data Transmissions
6(H)	11820	University of Washington Television (digital) / KEXP-FM, Seattle, WA (digital)
7(V)	11840	Data Transmissions
8(H)	11860	Data Transmissions
9(V)	11880	TARBS (Television and Radio Broadcasting Services) World TV (digital)
10(H)	11900	Data Transmissions
11(V)	11920	TARBS (Television and Radio Broadcasting Services) World TV (digital)
12(H)	11940	Data Transmissions
13(V)	11960	ISKYCOM: KBS / SBS / YTN / WOW / ISC / Radio Korea (digital)
14(H)	11980	Data Transmissions
15(V)	12000	California Community College CCCSAT/CCN (digital) / Data Transmissions
16(H)	12020	Data Transmissions
17(V)	12040	Occasional video
18(H)	12060	Occasional video
19(V)	12080	TARBS (Television and Radio Broadcasting Services) World TV (digital)
20(H)	12100	Occasional video
21(V)	12120	Occasional video
22(H)	12140	Occasional video
23(V)	12160	Occasional video
24(H)	12180	Occasional video

Monitoring the Bayou City – Houston

The fourth largest city in the United States is located in the Lone Star State of Texas. Houston, the “Bayou City,” encompasses a patch of land twice the size of the state of Rhode Island. It is a hotbed of federal monitoring activity, including NASA’s Johnson Space Flight Center where space shuttle missions are controlled.

Here is the *Fed Files*’ profile for Houston, Texas.

HF

(Frequencies in kHz and mode is USB unless otherwise indicated)

Coast Guard (NOY9)

2182.0 2261.0 2670.0 2683.0 2699.0 3120.0 3123.0
5320.0 5692.0 5696.0 8980.0 8984.0 11195.0 11198.0
11201.0 15081.0 15084.0 15087.0 27065.0 (AM)

Customs Service (KAE462)

3116.0 3134.0 3292.0 3369.0 3428.0 4500.0 4729.0
5277.0 5571.0 5700.0 5732.0 5841.0 6716.0 7300.0
7657.0 8912.0 9014.0 9023.0 9497.0 10242.0 11076.0
11217.0 11288.0 11408.0 11494.0 12140.0 12222.0
13204.0 13247.0 13312.0 13907.0 14350.0 14686.0
14690.0 14955.0 15048.0 15867.0 15964.0 17952.0
18027.0 18594.0 19131.0 20350.0 20631.0 20890.0
23214.0 23217.0 23227.0 23271.0 27870.0

Department of Veterans Affairs (KKE617) 27065.0 (AM)

Federal Aviation Administration (KMU31/KIC30)

3331.0 4052.0 4055.0 5860.0 6867.0 6870.0 7472.0
7475.0 7527.0 8125.0 13627.0 13630.0 16348.0
20852.0

Federal Bureau of Investigation (KKI88)

2332.0 2810.0 5060.0 5390.0 7905.0 9185.0 9240.0
9313.0 10500.0 10915.0 11075.0 11491.0 12140.0
14460.0 14495.0 15954.0

Federal Communications Commission (KIP69)

2110.0 4483.0 7602.0 7790.0 10654.0 13830.0 13990.0
18050.0 19230.0 22964.0 23035.0

National Aeronautics and Space Administration (KHA925)

2361.5 3379.0 3385.0 3388.0 3395.0 4603.0 5402.0
5821.0 5961.0 6106.0 6108.0 6810.0 6981.0 9462.0
11801.0 12129.0 12219.0 13633.0 13744.0 13780.0
14455.0 14836.0 14899.0 14908.0 15464.0 16201.0
18744.0 20063.0 22983.0 23390.0 27255.0 (AM)

VHF/UHF

(Frequencies in MHz and mode is narrowband FM unless otherwise indicated)

Animal and Plant Health Inspection Service (Agriculture) (KJN279/KOC355)

164.625 166.5625 411.525 415.525

Bureau of Alcohol, Tobacco and Firearms (KHA395)

165.2875 (Ch 1) 166.4625 (Treasury Common) 166.5375
173.8875

Coast Guard (NOY4/11)

156.300 156.550 156.600 156.650 156.700 156.800
157.050 157.075 157.100 157.175 381.700 381.800
383.900

Customs Service (KAE462/KAE464/KPS385)

164.600 165.2375 (Main) 165.6375 165.6875 166.225
166.4375 (R/in to 165.2375) 166.4625 (Treasury Common)
166.4875 169.450 171.075 321.300

Department of Veterans Affairs (KKE617/KLM566)

155.280 155.340 163.375 164.100 164.175 166.200
169.575 171.3875 171.975 173.125 408.025
409.325 409.400 409.775 414.400 416.100

Diplomatic Security Services

407.200 Repeater input to 409.625 (PL tone 151.40 Hz)
407.600 Low-power simplex protection agents at events Secondary (PL tone 151.40 Hz)
409.625 Command Post/Motorcades Primary (PL tone 151.40 Hz)

Drug Enforcement Administration (KLR771)

162.7875 170.900 171.450 171.600 171.700
172.000 172.200

164.600 Federal Drug Task Force (F6)

411.125 Repeater output

413.975 Repeater input to 411.125

415.600 Repeater input to 418.825

416.050 Repeater input to 418.625

416.200 Repeater input to 418.950

416.325 Repeater input to 418.900

417.025 Repeater input to 418.975

417.750 Repeater (F9)/Simplex (F10)

418.625 Beaumont/Houston Operations (F1)

418.675 Strike Force Repeater/Simplex (F4)

418.750 Strike Force/Car-to-Car (low power simplex) (F3)

418.825 Southwest Houston Operations (F5)

418.900 Houston Operations (F2)

418.950 Galveston Operations (F6)

418.975 Operations Repeater (F7)/Simplex (F8)

PL tone is 156.7 Hz for all frequencies

Emergency, Calling and Distress 121.500 243.000

Environmental Protection Agency 164.450

Federal Aviation Administration

162.250 165.7625 172.175 172.825 173.050
255.400 410.300 418.050 418.575 419.025

Federal Bureau of Investigation (KKF925)

155.775 162.6375 162.7375 163.8875 163.9125
163.9625 164.150 164.9375 165.350 165.5125
167.150 167.2875 167.3875 167.4375 167.5125
167.5625 167.5875 167.6125 167.6625 167.7875
170.050 170.350 170.825 170.900 171.175 173.025
173.100 414.375 419.450 (PL tone 167.9 Hz)

Federal Communications Commission (KIP69)

41.060 167.050 172.800

Federal Emergency Management Agency (KPS300) 173.7875

Federal Grain Inspection Service (KKM873)

411.300 415.300

Federal Reserve System (KLB662) 169.550 413.925 415.250

General Services Administration (KPA817-8/KPA841-2)

162.225 165.4125 413.950 415.200

Immigration and Naturalization Service (KAK988/KAK990/KAK996)

162.825 162.950 163.625 (F1) 163.675 (F4) 163.725
163.775

Internal Revenue Service (KAE282/KLE438-9)

163.125 165.950 166.000 166.4625 (Treasury Common)
167.000 167.100 414.325 414.700 415.000 415.100
418.100 418.175 418.200 418.225

Marshal Service (KRD684/KRD686) 162.7875 163.200
170.850 (Simplex 734 DCS Court Operations)

National Aeronautics and Space Administration, Johnson Space Center (WPBA275-282/284/289)

49.920 163.100 164.175 164.375 164.9625 168.350
169.600 170.125 173.8625 216.025 216.175 216.300
217.350 217.650 218.650 219.250 340.000 404.370
408.000

123.125 NASA aircraft operations (Ellington AFB) (AM mode)

154.280 Mutual Aid (emergencies/disasters only)

155.265 Civil Defense (emergencies/disasters only)

155.370 Texas Intercity (emergencies/disasters only)

164.200 Security net

164.700 Repeater input to 170.350

164.9875 Administrative net

168.000 Repeater input to 169.000

168.450 Repeater input to 170.375

169.000 Engineering/maintenance net building 1

170.100 Public affairs net building 45

170.350 Construction/maintenance building 49 (Alpha Net)

170.375 Medical net building 45

170.750 NASA aircraft operations (Ellington AFB)

171.000 Repeater input to 170.100

171.150 NASA TV audio (shuttle mission audio)

172.300 Repeater input to 173.8125

173.6625 Point net building 49

173.6875 Procedures net

173.8125 Transportation Net Building 320

235.400 NASA air-to-ground (Ellington AFB) (AM mode)

407.175 Repeater input to 409.175

409.025 JSC paging system

409.175 Medical network

429.6725 Bridge crane operations building 48

NOAA GEOS weather satellite uplinks

401.7175 401.731 401.7955 401.8915 401.893
401.8945

National Weather Service (KGG68) 162.400 (NOAA Weather Radio)

Secret Service (KAE427)

164.650 164.8875 165.2125 165.375 (Charlie)
165.7875 166.400 166.4625 168.125

Unknown Agency 170.4125

U.S. Post Office (KGM276/KHA264-5/KRO637/KPS234/KPS712-3/KPS797/KVO713/ KZY625-8)

169.850 170.175 170.600 406.375 407.725 (F3)
407.775 (F1 Inspection) 408.025 408.050 (F5) 409.200

409.275 410.200 (Maintenance/Transportation) 410.325
413.800 414.725 414.750 (F2 Inspection/Security)
415.050 (F4) 415.775 416.775 418.200 418.300 (Main
Post Office)
White House Communications Agency 162.6875 171.2875

◆ Houston Area Federal Trunk Systems

NASA is supposed to be sharing a 10-channel trunk network with other government agencies in the Houston area. To date no one has heard this system on the air. The trunk system is supposed to consist of the following frequency pairs (repeater output/repeater input):
406.350/415.150 407.150/415.950 407.950/416.750
408.550/416.550 408.750/417.550 408.950/417.750
409.150/417.150 409.550/418.350 409.750/418.550
409.950/417.950

Chris Parris reports a Motorola Type II ASTRO digital system (System ID 7707) which is a five channel system. The channels he identified with the *Trunker* program include 408.100, 410.025, 410.450, 412.425 and 414.300 MHz. The system seems to come in better near the downtown Houston area, but it does fade out in the Clear Lake/NASA area. All communications have been in ASTRO digital mode with nothing in the clear reported.

Chris has also heard a Motorola data channel on 408.300 MHz which IDs as system 550a. He was not able to determine any other channels used in the system, and the data channel was just marginally readable in the Clear Lake area. More information on this system is requested of area monitors.

◆ Eric Snags a TIS/HAR

Eric Huber in Glen Burnie, Maryland writes, "I was paging thru the October *Monitoring Times* when I came across the *Fed Files* with the information on TIS/HAR stations. I decided to poke around a bit and was very surprised to hear a message concerning Aberdeen Proving Grounds on 530 kHz. Aberdeen is currently processing the US Government Chemical Warfare Material. The station call was WUB4. It gave a phone number of 410-612-1416 to call for further information. The message also outlines other key points."

1. It gives the testing schedule for the warning sirens.
2. It gives a webpage address but the skip has moved in and some Spanish speaking station is currently covering them.
3. The message outlines 3 steps for residents of Edgewood to perform should the sirens be sounded, indicating a real alert.
4. The sirens are tested on the first Wednesday of each month.
5. Lastly, it gives two broadcast radio stations 103.7 MHz (FM) and 970 kHz (AM) to tune to for further information should an alert be sounded.

Eric says the message is very matter-of-fact, but still a bit chilling and wonders how many other TIS/HAR stations are broadcasting messages like this?

◆ DSCC Columbus

The Defense Supply Center Columbus (DSCC), Ohio, is one of the largest suppliers of weapons systems spare parts. It is a field activity of the Defense Logistics Agency, which

is in Ft. Belvoir, VA. DSCC manages more than 1.7 million different items and accounts for more than \$2.0 billion in annual sales. The installation has a long history in Columbus, Ohio, first opening its gates in 1918.

Sam Gillogly, KA8TEL, passes along the following list of frequencies being used at DSCC.

407.225	Maintenance/Engineering
407.300	Security dispatch repeater
407.525	Operations/Transportation
407.575	Fire/EMS dispatch
412.850	Repeater input to 407.225
412.900	Repeater input to 407.300
412.950	Repeater input to 407.525

Sam also points out since their transceivers have duplex capability, the delay feature on the scanner should not be used when monitoring the frequencies above.

For Sam and the rest of our readers, you might want to check the following additional frequencies for activity from DSCC:

407.275	Warehouse areas (repeater input 409.500)
408.050	Admin Net (repeater input 410.200)
408.150	Security simplex
409.175	Security simplex
412.875	Paging system
413.225	Engineering repeater
413.525	Engineering repeater

◆ Indiana/Kentucky Fed Frequencies

David Smith passes along the following list of federal frequencies he has monitored recently.

Census burials in Jeffersonville, Indiana

165.4625	Mail Delivery between buildings
410.050	Maintenance
413.900	General Services Administration (GSA)
413.950	General Services Administration (GSA)
415.200	General Services Administration (GSA)
451.650	Used this frequency for security until the first of the year

VA Hospital (Surgery) Louisville, Kentucky

409.775

Drug Enforcement Administration

418.750	Aircraft and Cars
418.825	Base, mobile and point-to-point from Louisville to Chicago

Fort Knox, Kentucky Military Police

164.625 165.0875

◆ Unusual Fed Frequency

Regular *MT* reporter Bob H. Eisner passes along the following unusual federal frequency he recently monitored.

Bob writes, "Came across an interesting frequency recently. It's a Security frequency for some Park Ranges in the Angeles National Forest. What makes this one so interesting is it's a repeater on 457.6125 MHz (PL tone 88.5 Hz).

"They have a phone patch which allows them to answer the phone at the ranger station while they're out and about. Any ideas on what the input frequency might be?"

I have nothing in my files Bob. Any of our readers care to comment?

◆ Monitoring the First Lady in Texas

War Driver in Texas writes, "recently the First Lady, Laura Bush, visited the Texas Tech Museum in Lubbock, Texas, to view the Fresco artwork at the Vatican Exhibit. I scanned all the Federal frequencies that I could find with my Uniden BC780XLT scanner. This is the only thing that I found – 165.450 MHz (PL tone 103.5 Hz).

All transmissions were in the clear. The signals were very weak. I believe the power level of the radios were probably around 50 mW. One radio being used by "Command" was stronger than the others. It may have been positioned on a rooftop. All the transmissions were very brief and infrequent.

◆ Department of Energy Trunk System

Chris Parris filed the following report on a trunk system in the area around Hanford, Washington, and Umatilla, Oregon. Chris writes, "Can anyone tell me if there is a 400 MHz trunk system for the Department of Energy facility at Hanford, WA? I was recently through the area and found a 400 MHz EDACS system in operation that sounded very much like it could be the DoE at Hanford, but some web sites seem to think this system is for the US Army Chemical Depot at Umatilla, OR, just south of where Hanford is.

"I recall seeing something posted about Umatilla getting a 400 MHz trunk system, but could not find anything other than the EDACS system below in operation. I was hearing the Umatilla security forces on VHF (141.400 MHz), but they made reference to an XTS-3000 radio on a different net."

System Type: EDACS

EDACS system ID: 0001

Frequencies: 406.350 406.750 407.150 407.350
408.950 409.950 408.150 409.550 409.750

Chris, my notes show that this system does belong to the Hanford Environmental Health Foundation in Washington States. The frequencies I have for the system include the ones mentioned above and 407.950 408.150 408.750 MHz.

And that wraps it up for this month. I would like to thank all our reporters for their input to the *Fed Files*. Until next month, 73, happy holidays and good hunting.

GLENN HAUSER'S WORLD OF RADIO

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For the latest DX and programming news, amateur nets, DX program schedules, audio archives and much more!

Airport Frequencies and Using Charts

Seasons Greetings and welcome aboard, everyone. Thanks to Richard Rowland (VA), we're going to visit some airports in that venerable state and elsewhere. In addition, we'll remind you of some of the most enjoyable tools for enjoying our hobby: maps and charts.

Leesburg Executive Airport (IYO)

CTAF/UNICOM: 122.800;
ARINC - 132.000;
Dulles Approach/Departure - 126.100;
Dulles Clearance Delivery - 118.550

Norfolk International (KORF)

ATIS - 127.150;
UNICOM - 130.575;
Approach Control - 118.900;
Clearance Delivery - 118.500;
Ground Control - 121.900;
Tower - 120.800; Departure Control - 125.200.

Newport News-Williamsburg Int'l (KPHF)

ATIS - 128.650;
CTAF (Common Traffic Advisory Frequency) - 118.700;
UNICOM-122.950;
Tower - 118.700;
Ground Control/Clearance Delivery - 121.900.

Richmond International (KRIC)

ATIS - 119.150;
UNICOM (Aero Industries) - 122.950;
Million Air - 130.300.
Richmond Jet Center - 131.420;
Approach/Departure Control - 126.800 (S),
126.400 (E), 134.700 (NW),
Tower - 121.100;
Ground Control - 121.900;
Clearance Delivery 127.550.

San Antonio International (KSAT)

UNICOM: 122.95
ATIS: 118.9
WX ASOS: PHONE 210-829-4782
San Antonio Ground: 121.9 348.6
San Antonio Tower: 119.8 257.8
San Antonio Approach: 118.05 (141-270)
124.45 (360-090)
125.1 (271-359)
128.05 (091-140)
307.0 (271-359)
353.5 (141-270)
392.1 (360-090)
125.7
127.1
251.125
381.4

San Antonio Departure: 118.05 (141-270)

124.45 (360-090)
125.1 (271-359)
128.05 (091-140)
307.0 (271-359)
318.1 (091-140)
353.5 (141-270)
392.1 (360-090)
125.7
127.1
251.125
381.4
Clearance Delivery: 126.7
SCND: 120.3
121.2
239.025

269.1
285.45
317.5
Class C 118.05 (141-270)
124.45 (360-090)
128.05 (091-140)
318.1 (091-140)
353.5 (141-270)
392.1 (360-090)
Class C IC: 125.1 (271-359)
307.0 (271-359)
Emergency: 121.5/243.0

John Wayne-Orange County Airport ((KSNA)

CTAF: 126.8
UNICOM: 122.95
ATIS: 126.0 (714-546-2279)
WX ASOS: Phone 714-424-0590
John Wayne Ground: 120.8 [0615-2300]
John Wayne Tower: 119.9 (RWY 01R/19L) [0615-2300]
126.8 (RWY 01L/19R) [0615-2300]
379.9 [0615-2300]
128.35 [0615-2300]

*SOCAL Approach: 121.3 (TRACON)
SOCAL Departure: 128.1
Clearance Delivery: 118.0 121.85
Class C 121.3 (315-045)
124.1 (045-190 ABV 4,000 FT)
124.65 (190-315 AT OR BLO 3,000 FT)
127.2 (190-315 ABV 3,000 FT)
132.7 (045-190 AT OR BLO 4,000 FT)

*SOCAL is short for the Southern California TRACON for the many airports

in the area.

Memphis International (KMEM)

UNICOM: 122.95
ATIS: 127.75
WX ASOS: PHONE 901-332-3679
Memphis Ground: 121.65 RYS 18R/36L 17/35
121.9 RYS 18L/26R, 18C/36C, 09/27
379.2

Memphis Tower: 118.3 (RY 09/27)
119.7 (RYS 18C/36C & 18L/36R)
128.425 RYS 18R/36L, 17/35
257.8
Memphis Approach: 119.1 (176-355)
125.8 (356-175)
291.6 (176-355)
338.3 (356-175)
Memphis Departure: 124.15 (356-175)
124.65 (176-355)
284.7 (176-355)
385.45 (356-175)

Clearance Delivery: 125.2
ANG CP: 138.1 341.6
Class B IC: 119.1 (176-355)
125.8 (356-175)
291.6 (176-355)
338.3 (356-175)
Emergency: 121.5 243.0
Final: 126.7 263.6
IC: 119.1

119.7 (RYS 18C/36C & 18L/36R)

121.9 RYS 18L/26R, 18C/36C, 09/27

Nashville International Airport (KBNA)

UNICOM: 122.95
ATIS: 135.1 (ARR)
135.675 (DEP)
Ground: 121.9/348.6
Nashville Tower: 118.6 257.8
Nashville Approach: 120.6 (200-018)
127.175 (019-199)
360.7 (019-199)

387.0 (200-018)
Nashville Departure: 118.4 (019-199)
119.35 (200-018)
317.45 (019-199)
385.55 (200-018)
Clearance Delivery: 126.05
CLASS C: 119.35 (200-018)
385.55 (200-018)
CLASS C IC: 128.45 (019-199)

◆ Aero Charts, Maps, and other Aids

Believe it or not, aero charts and maps contribute a lot to understanding our hobby and helping to make what you hear a lot more interesting as well as realistic! Most of our experienced subscribers may know this, but the newcomers to our hobby are probably unaware that these tools can add a lot of fun and knowledge to our hobby. Using the frequency information on the chart, you can not only follow the communications but visually picture what the pilot is seeing below him.

Sectional Charts and VHF Terminal Control Area Charts:

Sectional charts are designed for visual navigation by slow and medium speed aircraft. There are 38 sectional charts that cover the entire United States. Their scale is fairly large - 1:500,000. That is, one inch on the chart equals 500,000 inches (6.86 nautical miles) on the ground. Since the sectional and terminal control area (TCA) charts are used for visual navigation, they are designed to highlight information a pilot will see from an aircraft. Topographic information on the charts portrays the terrain and elevations. Also highlighted are visual checkpoints used for visual flight rules (VFR) flights. They include populated places; drainage such as lakes, rivers, and creeks; roads and railroads, and other landmarks.

As you can well imagine, airports are highlighted on these charts. Essential information about each airport is shown next to its symbol, so a pilot has immediate, ready reference to the information - including frequencies. Sectional



and TCA charts also depict visual and radio aids to navigation, controlled airspace, restricted areas, obstructions, and other related data. Different colors highlight essential information such as boundaries of terminal control areas.

Terminal Control Area Charts are twice the magnification of sectional charts so that more detail may be included. That is because pilots using them are flying in a terminal control area, with its higher density of aircraft traffic.

In planning a flight under visual flight rules, a pilot will draw the route on a sectional chart, then devote careful study to the information presented on it. He will concentrate on identifying obstacles, locating potential emergency landing sites, highlighting navigational aids, and becoming as familiar with all aspects of the flight route as possible.

To use the charts, only a basic knowledge of map reading skills is needed. Each chart has a very comprehensive legend, which explains the symbols used on it. Sectional and TCA charts are revised semiannually; several Alaskan sectional charts and the Puerto Rico, Virgin Islands TCAs are revised annually.

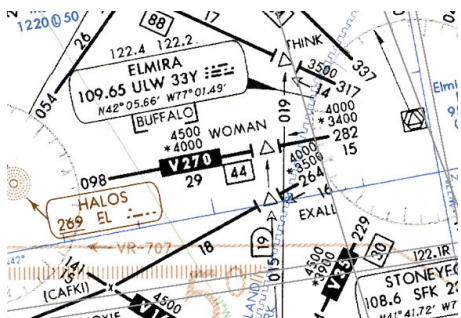
World Aeronautical charts:

These are drawn to a scale that is half that of the sectional – 1: 1,000,000. At this scale, one inch equals 13.7 miles. They are convenient for navigation by moderate-speed aircraft. There is less detail shown than on either the sectional or the TCA charts, because the scale is smaller.

Topographical information on the WACS includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief features (indicated by spot elevations, contours, and gradient tints). Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, and obstructions. These charts are revised annually, with the exception of several Alaskan and Mexican/Caribbean charts, which are revised every two years.

Enroute Low Altitude Charts:

These are designed for flight under instrument flight rules (IFR) in the low altitude stratum – the “victor” airways under 17,000 feet. The area charts furnish terminal data in a large scale format for congested areas such as Washington, Los Angeles, New York, Chicago, and several others.



Enroute High Altitude Charts:

They are charts are designed for flight in the high-altitude stratum – the jet route structure at flight level 180 and higher. These charts are less cluttered than the low-altitude ones, as

navigational aids are usually spread farther apart in the high-altitude environment.

Charted VFR Flyaway Charts:

These publications show multiple VFR routings through high-density traffic areas, which may be used as an alternative to flight within the major controlled traffic flows. The charts use a scale of 1:250,000.

VFR/IFR (Preflight) Planning Chart:

This chart is produced at a small scale of 1:2,333,232, or one inch for every 32 nautical miles. It is printed in two parts so that, when assembled, it forms a composite VFR planning chart on one side and an IFR planning chart on the other.

Flight Case Planning Chart:

This publication is designed for preflight and enroute flight planning for VFR flights. Scale is 1:4,374,803.

Gulf of Mexico and Caribbean Planning Chart:

(Self-explanatory)

North Atlantic Route Chart:

These are used for monitoring transatlantic flights by controllers and ground station radio operators.

North Pacific Oceanic Route Chart:

Also designed for use by controllers and radio operators.

Enroute High Altitude Planning Chart:

This chart is used for IFR enroute planning at or above 18,000 mean sea level. Information is revised every 56 days.

Instrument Approach Procedures (IAP) Charts:

IAP charts are published in 15 bound volumes displaying the aeronautical data required to execute instrument approaches to airports in the United States, Puerto Rico, and the Virgin Islands. New volumes are released every 56 days, and procedural changes occurring within the 56-day cycle are reflected in one volume issued at mid-cycle.

Standard Instrument Departure (SID) Charts:

Standard procedures for departing from a given airport.

Standard Terminal Arrival (STAR) Charts:

These charts expedite ATC arrival route procedures and facilitate transition between enroute and instrument approach operations. Both SIDS and STARS often have appropriate nicknames, e.g., the “HeHaw” arrival into Nashville, Tennessee. All SIDS and STARS names contain only five letters.

Alaska Terminal Publication:

This document contains charts depicting instrument approach procedures, standard instrument departures, standard terminal arrivals, airport diagrams, and radar minimums for use by all civil and military aircraft in the state of Alaska.

Helicopter Charts:

Aviators operating in major metropolitan areas with large concentrations of helicopters need these charts. Scale is 1:125,000, twice as large as the TCA charts previously mentioned.

There are other charts and maps, but the aforementioned are the most important ones for pilots to use. You can obtain these charts and maps at your local fixed base operator, as well as from several companies on the internet. They come as folded paper charts, or on CD, or as software. Different companies may present the information using different colors, and topographical details such as mountains may be shown as line art or in 3-D. Whatever the format, they’re educational, fun to use, and a big help when monitoring the aero bands.

That’s all for now. See you all in February with more aero news and views. Until then, Merry Christmas, Happy Chanukkah, Kwanzaa, and Happy New Year to all.

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Make Way for Digital Broadcasting

In-band On-channel, or is it? By the time you read this, action is likely on FCC Mass Media Docket #99-325. It's almost certain Ibiqity Digital Corporation's "HD Radio" system will be approved (*It was...ed.*). What will digital mean for listeners? For DXers? Hang on, the ride is just starting...

The new signals are neither AM nor FM. However, Ibiqity – and just about everyone else – calls digital radio at 530-1710 kHz "AM IBOC," and at 88-108 MHz "FM IBOC." I'll stick with this terminology. IBOC, again, stands for "In-band On-channel." This means a station's digital signal is broadcast in the same frequency band as its analog signal (as opposed to the Eureka system used in Europe and Canada, which uses frequencies near 1500 MHz or, as in the UK, 219 MHz). It also means the digital signal is broadcast on the same frequency as the analog signal. In other words, WSM-650's digital signal is also broadcast on 650 kHz, rather than on a separate allocation of, for example, 1330 kHz.

AM IBOC defines both a "hybrid" system and an "all-digital" system. Hybrid allows simultaneous analog and digital broadcasts on the same frequency. Once enough analog radios are replaced with digital units, the analog broadcast can be shut off and the station can switch to all-digital. The all-digital mode allows the transmission of additional information – for example, the "RBDS" station-identification data carried by some FM stations.

The hybrid mode establishes three sets of digital sidebands. The first is broadcast between 9.6 and 14.7 kHz from the center of the channel; the second between 4.9 and 9.6 kHz out, and the third overlaps the analog signal. The first sideband is broadcast at a strength 30dB below that of the analog signal. For a 50,000-watt analog station, that would be 50 watts of digital power. The second sideband is either 37 or 43dB below the analog signal – that's either 2.5 or 10 watts. The amplitude of the third sideband is not yet determined. Two reference sidebands would be transmitted at 181.7 Hz either side of the center of the channel at 26dB below the analog signal – 125 watts for a 50,000-watt analog station.

In all-digital mode, the analog signal goes away. The third set of sidebands – the set that overlaps the analog signal – can be increased in strength to

30dB below what the analog signal would be if there was one – up to 50 watts for a 50,000-watt analog signal. The second set would also increase to 50 watts, and the first to 15dB below analog, or 1,580 watts.

Whew! That's a lot of statistics. What does it mean for the DXer? Interference. An AM channel is 10 kHz wide. Anything more than 5 kHz from the center of the channel "spills over" into neighboring channels. DXer Kevin Redding has tagged it "IBAC," for "In-Band Adjacent-Channel," and he's right.

If WSM-650 was using hybrid IBOC, its first digital sidebands would stretch between 635 and 640 kHz, and between 660 and 665 kHz. The second digital sidebands would stretch between 640 and 645, and between 655 and 660. I live 33 miles from WSM-650, and 185 miles from WCRV-640 near Memphis. With a receiver with good selectivity, during the day I can hear WCRV without much trouble. If WSM were to begin AM-IBOC broadcasts, its lower digital sidebands would stretch into WCRV's channel. Some quick calculations show the interference probably wouldn't be strong enough to wipe out WCRV completely, but it would definitely be loud and noticeable.

The situation at night could be much worse. In recognition of that fact, the National Radio Systems Committee is recommending that AM-IBOC be authorized for daytime use only.

What about FM-IBOC? FM-IBOC also has a "hybrid" and an "all-digital" mode. In the hybrid mode, the FM-IBOC sidebands

would be placed between 129 and 198 kHz from the center of the channel. For a station broadcasting on 105.9, these sidebands would stretch between 105.7 and 105.77 MHz, and between 106.03 and 106.1 MHz.

This, too, spills outside the assigned channel. The selectivity of FM receivers is worse than that of AM sets. Only the most hard-core FM DXers attempt to DX frequencies adjacent to strong locals. Those DXers will suffer interference. There is even some fear in the broadcast community that second-adjacent suburban stations, like WLEY-107.9 and WRZA-99.9 outside Chicago, may disappear behind the FM-IBOC signals of center-city stations like WGCI-107.5 and WUSN-99.5.

More information on IBOC radio is available on Ibiqity's website <http://www.ibiqity.com>

♦ Bits and Pieces

Listeners on the West Coast will soon notice some dramatic programming changes on the AM dial. ABC/Disney owns ESPN Radio outlet KSPN-1110 and Radio Disney station KDIS-710, both in the Los Angeles area. Reports are that the two stations will swap frequencies on January 1st.

Speaking of frequency changes, another Georgia station has moved on the dial. Earlier this year, WEBS-1110 Calhoun moved to 1030. Now, WPBS-1050 Conyers has moved to 1040. WPBS also gets a power boost, going from 1,000 watts to 12,000.

Kansas State University's KKSU-580 Manhattan is no more. The 78-year-old station had shared its frequency with WIBW in Topeka, operating from 12:30 to 5:30pm weekdays. A dispute over KSU football rights (which had been granted to WIBW in 1969 in return for an additional 15 minutes of airtime) was resolved by WIBW paying the University \$1.5 million to surrender their 5 hours of airtime. A complete story of the KKSU/WIBW affair is available on <http://www.ksu.edu/facsen/facsenate/kksu-wibw.htm>

Are you hearing anything interesting on the dials? Write me at Box 98, Brasstown NC 28902-0098, or by email to dougsmith@monitoringtimes.com. Good DX!



WRTV digital TV, Indianapolis, as received 246 miles south of the transmitter.

Pirate Numbers Station Decoded

In recent issues of *Monitoring Times* our readers have reported loggings of parody pirate "numbers" stations, which use humorous substitutions for the numbers that have historically been used by intelligence agencies across the world to broadcast encoded messages.

Tom Severt, a veteran pirate DXer and editor of the "Covert Comms" column in *The ACE* bulletin of the Association of Clandestine radio Enthusiasts, revealed in the October *ACE* issue that the Rodent Revolution pirate numbers transmissions on WBNY have been decoded. The simple coding system on this station uses the number one for "A," the number two for "B," and so forth. The decoded messages are generally humorous pokes at pirate DXers. The National Security Agency and the CIA would love it if all such stations were so easy to decode.

◆ New Free Radio Weekly Editor

As we mention every month in this column, the *Free Radio Weekly* newsletter remains one of the most important sources for DX information on the North American pirate radio scene. Distributed every week on a cost-free basis to contributors over the internet via e-mail, *FRW* is invaluable to all serious pirate radio DXers.

The *FRW* staff has announced the addition of a fourth co-editor, John Sedlacek. The four *FRW* editors alternate their editing duties as time goes by. If you're interested in contributing to this publication, or in taking a look at it, an e-mail to any of the editors will get you started.

The complete current lineup of *FRW* co-editors, along with their e-mail contact addresses, is: Niel Wolfish, niel@ican.net and Harold Frodge, yukon@tm.net; and Greg Majewski, gregmajewski@worldnet.att.net and John Sedlacek, johnsedlacek@yahoo.com.

◆ Godzilla Born on Radio?

Paul Ormandy, one of the best DXers in Oceania and the well known host of *The South Pacific DX Report*, noted in *DXplorer* early this fall that it is possible that Godzilla, the well known monster, may have had his origin in a quasi-pirate broadcast from an American forces transmitter WVTR in Japan at the end of World War II. Paul has the full version of this interesting legend on his web site at http://radiodx.com/spdxr/wvtr_sea_monster.htm on the internet.

◆ Alpha Lima Web Site

Radio Alpha Lima, probably the most widely heard Europirate in North America, informs us that their web site at <http://www.alfalima.net>

provides supplemental information on their intermittent broadcasts on 15070 and 6210 kHz. Their actual transmissions can vary up or down a couple of kHz from their announced frequencies.

◆ What We Are Hearing

Our readers heard all of these North American pirate broadcasters this month. Most stations still transmit in the vicinity of 6955 kHz, although frequencies can vary up and down a little bit, often to avoid the Peruvian *La Voz de Campesino* after sunset, which can frequently be heard in North America on 6956.5 kHz. Pirate broadcasting increases noticeably on weekends, and around major holidays, such as this month's Christmas and New Years celebrations.

Captain Morgan- Rock music is still the forte here, although some content from the old *Twilight Zone* television show has been creeping in. (None, asks for reports on the Free Radio Network)

Indira Calling- One of the active pirate stations that parody All India Radio, this one mixes East Indian music with western rock tunes. Don't pay any attention to their announced Calcutta post office box. (Providence)

KBLK- This rap music pirate uses a slogan of, "The Shortwave Voice of Black Oppression. (Providence tentative)

KMUD- This one is best heard on the West Coast, so lots of its rock music shows are mainly from listeners in western North America. (Belfast)

Lounge Lizard Radio- Their unusual format concentrates on cocktail lounge music by people like Sinatra, Sammy Davis Jr., and related artists, as we see this month in their QSL. The shows supposedly are produced in cities where pirate DXers live. (Providence)



THE GUEST AT LOUNGE QSL SERIES
No. 1 - DEAN MARTIN

LOUNGE LIZARD RADIO

\$LIP US ON WHILE YOU SIP ONE DOWN!

To: George Zeller
DATE: May 31/97 TIME: 0312
FREQ.: 6955.4 QSL No.: 0033
PROGRAM: #2, Mayya Lounge

73 FROM DEAN SCHOENBERG JB

Partial India Radio- This one is another one of the All India Radio parody stations, but the content is heavily dominated by issues in pirate radio, rather than items from the subcontinent. (Providence)

Radio Azteca- Bram Stoker's long-running pirate parody station still features a mix of rock music and comedy with a radio emphasis. (Belfast)

Sycko Radio- Since they fail to communicate with their listeners, the spelling of the station name here is still somewhat doubtful. Their format of rock music interspersed with amusing sound effects remains the same. (None)

United Patriot Militia Bingo- The pirate that parodies the now defunct KSMR clandestine

remains active despite the demise of its target. They still feature ads for Colonel Steve Anderson action figure dolls, along with an "Anderson on the Run" song to the tune of Wings' "Band on the Run."

Voice of the Angry Bastard- Despite the station name, this pirate programs a diverse set of music from rock, to Afro-pop, to reggae. (Belfast)

Voice of the Runaway Maharishi- Maharishi Ali Ganja operates a couple of different pirates, all of which, like this one, emphasize drug advocacy. (Belfast)

Vox America- This veteran old-timer has returned to the air with their free speech advocacy, comedy, and rock music. (None, asks for loggings in *The ACE*)

WHYP- The James Brownard memorial station, allegedly from North East, PA, still provides obsolete temperatures for Lake Erie cities mixed in with pirate radio sketches, such as their game show, "Who Wants to Be a Pirate Radio Operator. (Providence)

WMPR- This dance party station has been the most active North American pirate station lately with rock music and identifications by both a male and female announcer. Some of us notice bird chirping noises during the IDs. (Still none; occasionally verifies loggings in pirate DX bulletins)

◆ QSLing Pirates

Reception reports to pirate stations require three first class stamps for USA maildrops or \$2 US to foreign locations. The cash defrays postage for mail forwarding and a souvenir QSL to your mailbox. Letters go to these addresses, identified above in parentheses: PO Box 1, Belfast, NY 14711; and PO Box 28413, Providence, RI 02908. Some pirates prefer e-mail, bulletin logs or internet web site reports instead of snail mail correspondence. The best bulletins for sending pirate loggings with a hope that pirates might QSL them remain *The ACE* (\$2 US for sample copies via Belfast) and the e-mailed *Free Radio Weekly* newsletter, still free to contributors via the various addresses discussed above. The Free Radio Network web site is found at <http://www.frn.net> on the internet.

◆ Thanks

Your loggings and news are always welcome via 7540 Highway 64 W, Brasstown, NC 28902, or via the e-mail address atop the column. We thank this month's valuable contributors: Jerry Berg, Lexington, MA; Ross Comeau, Andover, MA; Harold Frodge, Midland, MI; William Hassig, Mount Prospect, IL; Larry Magne, Penn's Park, PA; Greg Majewski, Oakdale, CT; Bill McClintock, Avon Lake, OH; Paul Ormandy, Wellington, New Zealand; Lee Reynolds, Lempster, NH; Martin Schoech, Merseburg, Germany; Bud Stacey, Setsuma, AL; Niel Wolfish, Toronto, Ontario; and Joe Kenneth Wood, Gray, TN.

Miscou '02 – Another Success

For the second year in a row I had the pleasure of attending a listening expedition at Miscou Island, New Brunswick. This year's event ran from October 4-10 and also included Jacques d'Avignon (VE3VIA), Ken Alexander (VE3HLS), and Niel Wolfish (ODXA Mediumwave editor). Our venue was the same as last year – a cottage by the ocean. We selected this spot for its RF-quiet conditions and the clear path it affords to much of Europe and Africa.

You don't travel for 22+ hours to reach a DXpedition and bring just any old gear! Our equipment lineup included three AOR 7030+ receivers, a Drake R8 receiver, DSP and PLL filters, an antenna phasing unit, tape recorders, headphones and *piles* of reference material. Antennas were plentiful and large. We laid out three terminated Beverage wires at 090, 135 and 180 degrees. Each wire was about 1000 feet long. For extra measure, we also erected a large aperture broadband loop near the shoreline. All of the antennas were fed into amplified splitters and routed to coaxial switches that allowed each operator to select his own antenna.

What We Heard

Jacques and I focused our efforts on longwave, while Niel and Ken hunted for distant mediumwave signals. This report is limited to longwave intercepts; however, Jacques d'Avignon is preparing a feature-length article for an upcoming issue that will also discuss the MW successes at Miscou. Table 1 shows a sampling of the longwave stations received. (Note: The "ST/PR/ITU" column lists the State, Province, or ITU country code, respectively. A key to the ITU abbreviations appears at the end of the list.)

After logging 19 countries on longwave last year, we had doubts that we could do much better this year. However, by the third night we already had 31 countries in the logbook. To me, the most rewarding catches were 382 kHz/LAR (Portugal) and 297 kHz/FI (Spain). Reception of mainland Europe beacons is exceedingly rare for North American listeners. One of our farthest catches was 360 kHz/ASN, Ascension Island, at 4856 miles/7815 km. At one point this beacon and another rarity – 359 kHz/NA (Greenland) – were battling it out and we had trouble separating them in our headphones!

Selected Loggings from Miscou Island, NB

FREQ.	ID	ST/PR/ITU	LOCATION
153	Bdcast	ALG	Algeria-Radio Alg. Int'l
162	Bdcast	F	Allouis-France Int'l

171	Bdcast	MRC	Morocco-R. Med. Int'l
183	Bdcast	D	Europe #1
189	Bdcast	ISL	Rikisutvarpid Ras
198	Bdcast	G	England-Bbc
198	DIW	NC	Dixon
204	YFY	NU	Frobay (Igaluit)
216	Bdcast	F	Radio Monte Carlo
216	LRG	ME	Lincoln
216	Bdcast	F	Radio Monte Carlo
248	MBJ	JMC	Montego Bay
252	Bdcast	ALG	Radio Alger Int'l
257	TBY	CT	Oxford
265	JH	GRL	Julianehab (Qaqortoq)
266	"E" UNV	CUB	Nuevas
266	UBY	CUB	Bayamo
268	UBY	CUB	Bayamo
270	FLO	AZORES	Flores
270	Bdcast	CZE	Ceskyrozhlas
270	NN	GRL	Nanortalik
272	OLD	ME	Old Town
274	SAL	CPV	Sal
279	SI	GRL	Simiutaq
284	RT	NU	Rankin Inlet
285	UHA	GRL	Qaqqatq
296.5	FI	E	Cabo Finistere
298	KU	GRL	Kook Islands
314	GH	GRL	Godthaab/Nuuk
326	BHF	BAH	Freeport
328	HB	GRL	Holsteinborg
330	CZM	MEX	Cozumel
331	FH	GRL	Frederikshaab
332	FIS	FL	Key West
338	PST	MDR	Porto Santo
345	BGI	BRB	Barbados
353	HOI*	VEN	Higuerote
359	NA	GRL	Narsarsuaq
360	ASN	ASC	Ascension
360	KIN	JAM	Kingston
362	GND	GRD	Point Salines
362	YZS	NU	Coral Harbour
369	ZDX	ATG	St. Johns
371	MGL	AZR	San Miguel
372	OZN	GRL	Prins Christian Sund
375	BUN	CLM	Buenaventura
376	ZIN	BAH	Great Inagua
380	UCY	CUB	Cayoabo
380	FIL	AZR	Horta
382	POS	TRD	Port Of Spain
382	LAR	POR	Arruda
382	SF	GRL	Sondrestrom Fjord
386	SP	SPM	St. Pierre
387	PV	TCA	Providenciales
388	AM	FL	Tampa
388	RNW	NC	Chocowinity
391	DDP	PTR	Dorado
400	CI	MI	Sault Ste Marie
402	MQ	SPM	Miquelon
404	IUB	MDR	Baltimore
407	OX	MDR	Ocean City
410	PEL	B	Pelada
415	CBC	CYM	Cayman Brac
417	HHG	IN	Huntington
419	RYS	MI	Detroit
450	PPA	DOM	Puerto Plata
526	ZLS	BAH	Stella Maris
1649	SS53	??	Unid; Keyed Carrier CW

* Presumed miskeying of "HOT"—Higuerote, Venez.

Key to ITU Country Codes

ALG-Algeria	F-France	MRC-Morocco
D-Germany	ISL-Iceland	G-Great Britain
JMC-Jamaica	GRL-Greenland	CUB-Cuba
AZR-Azores	CZE-Czech Republic	CPV-Cape Verde
E-Spain	BAH-Bahamas	MEX-Mexico
MDR-Madeira	BRB-Barbados	VEN-Venezuela
ASC-Ascension	ATG-Antigua	CLM-Columbia
TRD-Trinidad	POR-Portugal	SPM-St. Pierre & Miquelon
TCA-Turks & Caicos	PTR-Puerto Rico	B-Brazil
CYM-Cayman Islands		

Besides Listening

During the night of Monday, October 7th, we were treated to a spectacular display of Aurora Borealis (Northern Lights) in the sky. We discovered it when mediumwave signals began wavering a bit. We peeked outside to investigate the skies and saw a massive Aurora in progress. The sky was pulsating with green, red and yellow spikes against a background "curtain" of light that was drifting horizontally. It was a sight I'll never forget. We managed to catch a few photos of the light show, and one of these is shown in Figure 1.



Figure 1. Northern Lights Display Observed During Miscou, NB, Expedition (Courtesy Ken Alexander, VE3HLS)

Other News

The ARRL Letter reports that Argentina hams will be the next to gain access to the 135.7-137.8 kHz LF band. This comes as a result of a request made by Radio Club Argentino (www.lu5aa.org) to government officials. The ruling will designate the Amateur Service as a secondary user on the band.

Via the Internet comes word of some low power shortwave beacons that listeners in the western U.S. may want to try for. These stations are unlicensed "pirates" that we first discussed in this column a few years ago. Apparently, the operators run them for propagation tests and do not QSL. Here are the latest details for these stations:

Freq.	ID	Location	Remarks
6700.4	61 dashes/sec.	S. Mojave Desert	24 hr. op
7649.9	138 dits/min.	N. Mojave Desert	24 hr. op, 1W
8000.5	S	S.W. Arizona	Days (solar pwr.), 1W

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Bearcat 278CLT 100 ch. AM/FM/SAME WX alert scanner.....	\$139.95
Bearcat 250D 1,000 ch. TrunkTracker III handheld scanner.....	\$339.95
Bearcat 245XLT 300 ch. TrunkTracker II handheld scanner.....	\$189.95
Bearcat 248CLT 50 ch. base AM/FM/weather alert scanner.....	\$84.95
Bearcat Sportcat 200 alpha handheld sports scanner.....	\$159.95
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Bearcat 80XLT 50 channel handheld scanner.....	\$99.95
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Ham Radio Stocking Stuffers

Well, here we are once again, boys and girls. It is now December and we have entered, full force, into the season of conspicuous consumption. Whilst we "*Deck Us All With Boston Charlie!*" (If you get the reference, good on you!), it is time once again for me to invite all the little Ham boys and girls to sit on the carpet in Old Uncle Skip's shack and warm their hands over a glowing 5146B. Of course we will talk about the wonderful goodies we want to see come our way during this season of giving and good cheer.

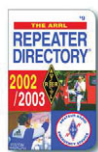
After all... we've all been good little amateurs and we've been studying hard at upgrading our licenses. We've been checking into our local and regional emergency services nets. We've been running traffic for the men and women serving our country so far away from friends and family during this holiday season. We've sent QSL cards to every station we've worked. It's only reasonable to assume that the Jolly Ole' Elf from 180 degrees North of KC4 land should smile upon us all!

Yes folks, it's time for Old Uncle Skip's annual look at the great stuff we would like to find as holiday gifts. This year I will forego the high end gear (although Santa is welcome to leave a TenTec Argonaut V at my house... I've been really really good!) in favor of a number of reasonably priced "stocking stuffers" that won't shred the check book or your significant other's nerves.

THE ARRL REPEATER DIRECTORY

ARRL Order # 8640
\$9.00 + \$4.00 Shipping in the US
The American Radio Relay League
225 Main Street, Newington, CT 06111-1494
<http://www.arrl.org/shop> (888) 277-5289

With over eighteen thousand repeater systems listed, the *ARRL Repeater Directory* makes a perfect stocking stuffer for any ham. I find I get one of these from my harmonics each year instead of a tie. This has created a nice little tradition. The new one sits in my shack, the previous year's edition goes in my commuter car, and the even more previous one works its way into the glove compartment of my XYL's car. Older ones get retired to the top shelf in my shack.

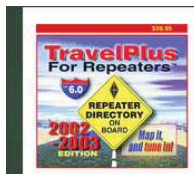


If you want to go a bit more high tech for your repeater information, take a look at the League's other great stocking stuffer.

THE ARRL TRAVELPLUS FOR REPEATERS 6.0
ARRL Order #8675
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Travelplus 6.0 gives you all the information in the *Repeater Directory* and a whole lot more. You use the software's excellent mapping database to plot your route and then have the software tell you all the repeater systems along the way. I would not want to take a long trip without first consulting this "Oracle" of radio information. New features include custom repeater lists that can be printed out or transferred into a Palm™ OS based PDA.

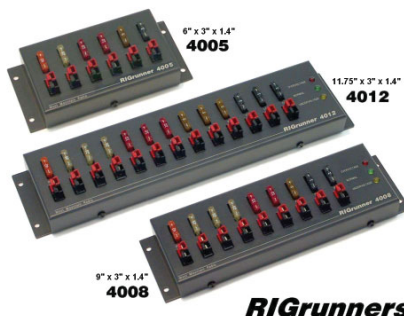
The software also now supports GPS tracking, making it an idea adjunct to APRS systems. And just for fun and family peace, the database now includes AM/FM radio stations along your trip route. (Note: This program requires Windows 95 or higher and at least a Pentium or compatible microprocessor.)



How about another great stocking stuffer?

RIGrunner DC POWER PANELS
\$49.95 and up
West Mountain Radio
18 Sheehan Ave., Norwalk, CT 06854
<http://www.westmountainradio.com>
(203) 853-8080

Any product that helps to clean up the rat's nest of wires that occurs at the back of most ham stations' benches is worth a strong



RIGrunners

look. Recently the ARES and RACES uniform DC power connector system was moved over from classic Molex™ style connectors to PowerPole® connectors. The PowerPole system has a number of advantages in that it is polarized and color keyed for easy use.

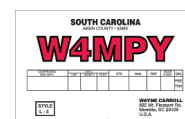
Rigrunner DC power panels provide standardized connections, each of which is ATC fused, and they include LED "open" fuse indicators to allow quick replacement. Some models also include LED and audio alarms to indicate overvoltage and undervoltage, important in field use.



Nothing says so much about a ham and his or her dedication to the hobby as his QSL card. Why not treat yourself this holiday season to some of the best?

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Okay, this may fit into a stocking, but you will need a good strong nail in the mantelpiece to hold it up.

THE MIRAGE B-34 35 WATT 2 METER FM AMPLIFIER
\$69.95 suggested retail
Mirage Communications Equipment
300 Industrial Park Road, Starkville, MS 39759
<http://www.mirageamp.com> (800) 647-1800

If you think back to my article about the lessons learned after September 11th 2001, I mentioned that relatively low-powered hand-talkies didn't cut much mustard in real world

emergency communications. Well, here is the way to get some oomph into your signal without breaking the bank and buying a whole new rig. Two watts on 2 Meters delivers a clean and heatsink-cooled 35 watts out to the antenna: enough to make plenty of difference in either mobile or base station communications. The unit is physically quite diminutive at 3-1/8 x 1-3/4 x 4-1/4 inches. If your rig also is capable of CW and or SSB modes of operation, the slightly more expensive BG-34-G unit (\$89.95) does a great job, too, and has the added advantage of an 18 db GaAsFET preamp.



Trying to keep track of all those contacts and contests? Here is a stocking stuffer that will get the job done in style

WIN-EQF EQF Software \$59.95

547 Sautter Drive, Crescent, PA 15046
<http://www.eqf-software.com> (724) 457-2584

I'm trying to remember the first time I ran across the original Log-EQF program. I know I recently found a very early shareware version on an old Intel 286 PC I was scrounging in my basement. Now in a Windows version (diehards can still get the DOS version for \$49.95), Win-EQF provides not only excellent logging under the most arduous contest conditions, it also provides all manner of station control applications. The software interfaces with all the major callsign database CDs, as well as various QSL manager programs such as the "GOLIST". It also provides award tracking, DX cluster spotting, beam headings and address label printing. If you are CW oriented, you will also appreciate the CW Keyboard/ Memory Keyer functions.



Need a good antenna? Here's one that will fit in a stocking (at least until you need to actually use it).

THE MFJ G5RV ANTENNA #MFJ-1778 \$39.95

MFJ Enterprises, Inc.
Box 494, Mississippi State, MS 39762
<http://www.mfjenterprises.com> (800) 647-1800

The classic G5RV antenna as rendered here by the MFJ folks can be loaded on all amateur radio bands between 10 and 160 meters when used with an antenna tuner. Yet, the overall length is less than that of a full-sized 80-meter dipole. The design works well using a single high mounting point in an "inverted vee" arrangement. The G5RV is a good way to go if you can only put up a single wire antenna. It also makes a great camping and vacation antenna.



It's a bit big for a stocking, but this is still a great idea.

ATOMIC TIME 0645R DIGITAL WALL CLOCK \$29.95

Atomic Time
1010 Jorie Blvd, #332, Oak Brook, IL 60523
<http://www.atomictime.com> (800) 985-8463

Now you only have to listen to WWV to get the propagation reports. This is because the Atomic Time Clock does the listening for you and accurately resets itself to the most reliable time system on earth. This is one of those things that, when you first find it under your Christmas tree as I did last year, you say to yourself, "Well, that's nice but..." Then after having it hang on the shack wall for a couple of weeks you realize that you just can't get along without it. The unit can be set for 12 or 24 hour time and includes calendar, temperature and alarm functions.



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The W5YI Group
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Gordon West WB6NOA and the rest of the W5YI Group have cooked up a package that covers all you need to know to get through the Element 4 and the new question pool that took effect July 2002. Getting a gift like this puts you in an excellent position to make a New Year's resolution to finally reach the elite rank in ham radio, the Extra.

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ARRL 10-Meter Contest

Dec 14, 0000 UTC - Dec 15, UTC
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Digging into a Dirty Radio

Last month I introduced our latest restoration project – or should I say restoration challenge – a Zenith “black dial” tombstone set, Model 6S229. While more-or-less complete, this set was a sorry sight indeed. This is the kind of radio that a housewife would immediately put out in the alley during a basement cleanout. If it were later spotted next to the garbage cans by a radio collector, it would probably get picked up – but only to be placed on a back shelf as a potential parts set. I’m taking on the restoration of this radio as an encouragement to those adventurous souls who might enjoy the idea of bringing back an iffy receiver from the brink of destruction, thereby preserving a little piece of our radio heritage.

In last month’s column, we gingerly looked beneath the heavy layer of gummy dirt coating this neglected set and carried out a first assessment. Among the most obvious problems uncovered were a messed-up dial mechanism, missing tube shields and an output transformer that is probably burned out. Although most of the wiring looked untouched and intact, there were a couple of places where crude work had been done – some of it in order to install an accessory phono jack. Fortunately the power transformer – which would be difficult to replace – was intact.

◆ Dismantling For Clean-Up

The first thing I wanted to do this month was to clean the layer of nasty dirt off the top surfaces of the chassis. To make the job a little easier I decided to remove the shield cans covering the r.f. and oscillator coils and the two i.f. transformers. Each of these cans was fastened with four nuts: two at the top – which secured the interior coil assembly to the top of the can; two underneath – which secured the bottom of the can to the chassis.

To do this kind of work, it’s handy to have a set of nutdrivers, especially for loosening and reinstalling nuts surrounded by wires and components under the chassis. When you select a set, check to see that the sockets are reasonably deep. The drivers already on my bench, which happen to be very inexpensive, didn’t have enough depth to clear the studs on which the nuts were threaded. I had to run out to the hardware store and get a new set.

I decided also to remove the tuning capacitor. For one thing, I wasn’t able to remove the dial pointer and dial scale with the unit in place (more on this later). For another, I needed access to the entire unit to clean it properly. Finally,

getting it out of the way would make it possible to do a much better job of cleaning the top of the chassis.

Removing the tuning capacitor is quite often necessary when dealing with a really dirty radio. But it’s usually not a job to be undertaken lightly. Most of the connections to this component will be made under the chassis, and these may well be buried beneath a coil assembly or some other obstruction. On top of that, the unit will be grounded, maybe in two places, usually via some heavy braid soldered directly to the chassis.

You can’t touch this solder with a Radio Shack 50-watt iron, or even one of those antique 90-watt American Beauties with the fat asbestos cords. I use a modern iron I was fortunate enough to pick up at a garage sale. The rating label has dropped off but I believe it is a 200-250 watt size. I’ve seen these in the hardware stores – made by Ungar, I believe – and they seem very expensive for what they are (maybe 20 bucks or more). But every serious radio restorer needs one in his kit!

This particular tuning capacitor came out fairly easily. For one thing, the connections were accessible. (All the coils in this radio are above the chassis in cans rather than cluttering things up below decks.) And (I’ve never seen this before), instead of heavy-duty metal braid, the capacitor is grounded via a pair of fairly thin metal tabs mounted to its base. These tabs are soldered, face to face, to another pair of metal tabs that are, in turn, soldered to the chassis. Since the tabs are somewhat isolated from the heat sink effect of the

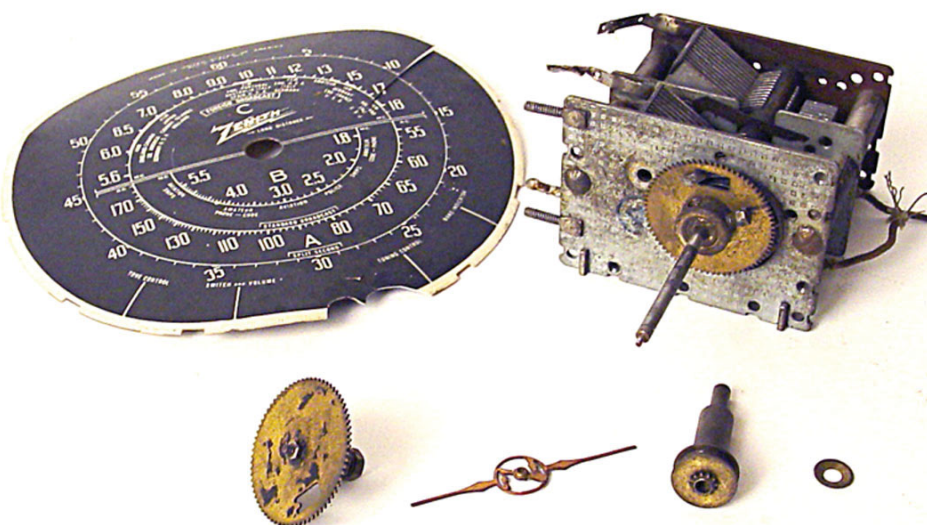
metal chassis, it took only a touch of the big iron to melt the solder holding them together.

With the shield cans and capacitor out of the way, I went to work with paper towels and mineral spirits to remove the grime. It gave up fairly easily, though it did require some hard rubbing in a few places. The painted finish that was slowly revealed (it is a classic Zenith hammered copper effect) is in amazingly good shape. There were only a few places where the surface was a little bubbled due to corrosion. I wasn’t too happy with the looks of the power transformer, however, which still has a scuffed dirty appearance even after cleaning. I’ll very likely decide to freshen it up with a new coat of black paint.

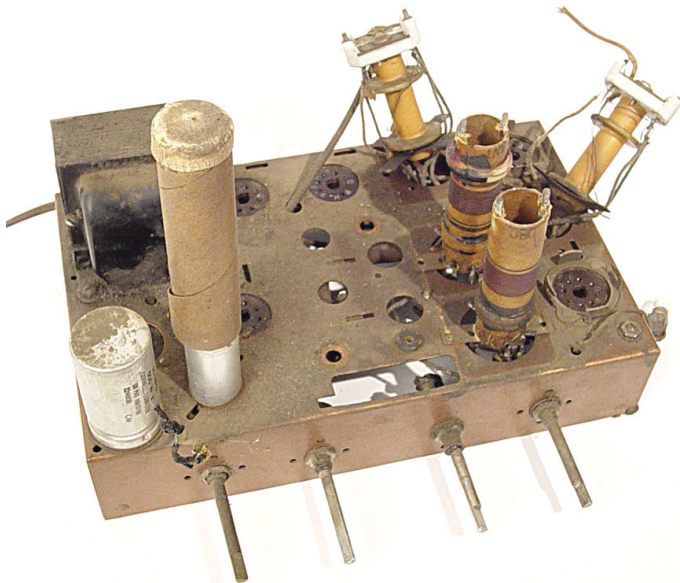
◆ Tuning Drive Disassembly

With the tuning capacitor and dial scale unit removed as a single assembly, I could now address the problem of removing the station selector pointer and dial scale. The pointer, a copper-colored decorative item with a Zenith “Z” logo in the center, had been installed backwards, as had the dial scale behind it. I had to remove them, anyway, in order to make it possible to dismantle the tuning capacitor’s gear drive assembly for cleaning and adjustment.

Earlier attempts to remove the “Z” pointer – which seemed simply to be press-fitted on its shaft – had proved fruitless. No amount of pulling or twisting made a difference, one problem being that the shaft was rotating along with the pointer. But now that the tuning assembly was removed from the set, I was able to slide the dial drive



Tuning capacitor assembly as dismantled for cleaning. Dial scale backing plate is not shown.



Here's the Zenith with the coil shield cans and tuning capacitor assembly removed to facilitate cleaning.

components apart enough so that I could reach in with long-nosed pliers and get a grip on the pointer shaft. Once the shaft was immobilized in this manner, the pointer pulled loose with just a couple of twists.

Now I could remove the dial scale and dial backing plate – making it possible to remove the clockwork-type gears and pinions comprising the pointer drive assembly. You'll recall from last month's column that besides the main station selector pointer (the "Z" pointer), this set is supposed to have a "split second" pointer, which travels around the dial several times for even a small movement arc of the station selector pointer. This provides a vernier effect and makes for more accurate station logging. The split second pointer is missing and is on my list of things to locate.

After completing the dismantling of the tuning assembly, I needed to turn the chassis upside down again. Not wanting to risk damage to the exposed r.f. and i.f. coil assemblies, I first cleaned and replaced all of the coil shield cans. Now I turned my attention to the electronics of the radio – removing the owner-added phono jack and switch and returning the wiring to its original condition. I also carefully examined another area of the set where the wiring had been disturbed, but found that – though it looked like an amateur had been there – the wiring was unchanged from what is shown in the schematic.

Next time, we'll probably get to work replacing all of the capacitors, at least partially reassembling the dial drive mechanism, and checking out the tubes that came with the radio.

◆ New Books

The FM Crystal Set Project

By Phil Anderson, W0XI, Published 2002 by The Xtal Set Society, P.O. Box 1625, Norman, OK 73070, <http://www.midnightscience.com>. 5-1/2 X 8-1/2 inches, 42 pages, softcover, \$9.95 + \$2.00 s&h.

A crystal set for FM listening? A pretty strange concept, but if something can be received with a crystal set, the folks at Xtal Set Society are going to figure out how to do it! Of course, crystal sets were never used by the general public to re-

ceive FM, as they were to receive AM during the dawn of radio broadcasting. Vacuum tube technology had long since replaced crystal set technology by the time FM broadcasting arrived in the mid 1940s.

But developing an FM crystal set was too interesting a challenge for author Phil Anderson, W0XI to resist. Turns out the major problem is not *detecting* the signal (it's done by a process called *slope detection*, or tuning slightly off the carrier frequency, as is carefully explained in the book). The real difficulty is in developing a tuned circuit that would have a high enough "Q" to achieve decent selectivity in the VHF band where FM is broadcast and enough sensitivity to drive headphones with limited (or nonexistent) audio amplification.

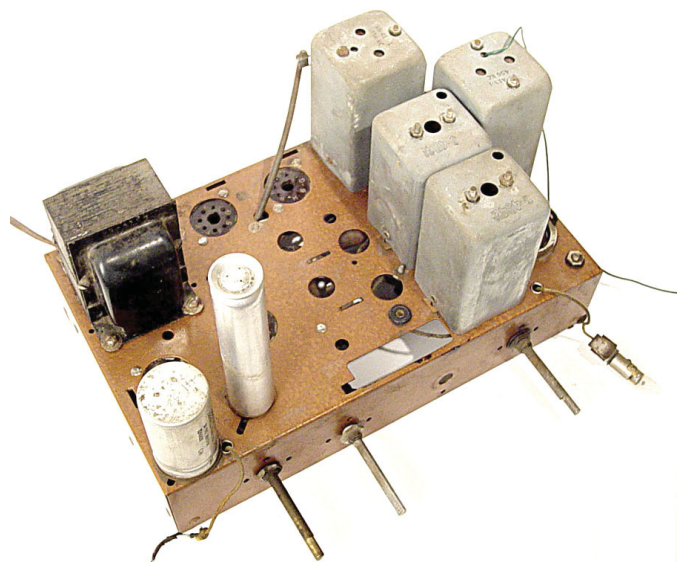
The solution is to substitute a *coaxial resonator* (pipe within a pipe) for the coil conventionally used in the tuned circuit. Full construction details are given in this interesting little book, as well as troubleshooting and operating instructions, circuits for adding audio amplification and substituting a small speaker for the headset, and a method for biasing a crystal detector to increase sensitivity.

1935 Official Shortwave Radio Manual

Edited by Hugo Gernsback and H. Winfield Secor, originally published by Short Wave Craft, reprinted 2002 by Lindsay Publications, PO Box 538, Bradley, IL 60915-0538, <http://www.lindsaybks.com>. 8-1/2 X 11 inches, 240 pages, softcover, \$18.95 + \$1.50 s&h.

Back in 1987, Lindsay reprinted the 1934 version of this fascinating journey into the world of the 1930s electronics hobbyist. Seems he has just discovered the 1935 edition and added it to his catalogue. Like its predecessor, the first part of this book contains construction articles and other information taken from the pages of *Short-wave Craft* magazine; the second part contains schematics and, in some cases, basic service information on the communications receivers (and broadcast sets with shortwave bands) of the day.

During the 1930s, the magic of shortwave



Here the top of the chassis has been freed of its layer of gummy grime. Shield cans were reinstalled immediately after cleaning to protect the coils.

listening was still fresh, and what made it all the more exciting was that the average hobbyist could hear stations from all over the world with just a tube or two and a handful of inexpensive parts. Since this was the depths of the Depression, economy was of paramount importance – as was reflected in the titles of the projects: "One-Tube Pocket Set Gets Europe," "3 Tubes=6 in This Super-Het," "The '19' Twinplex Makes 1-Tube Perform as 2."

I'm very glad that this sequel to the 1934 edition turned up; it's a browser's delight!

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The Effects of Earth and Other Objects on Radio Waves

Antennas in Space

The “radiation and reception pattern” (R&R pattern) of an antenna is a graphic representation of how the antenna distributes its radiation when transmitting into the space around it, and its responsiveness to signals when receiving. The term “R&R pattern” includes both transmitting and receiving patterns because they are identical.

In the literature on antennas the figures which show an antenna’s R&R pattern usually assume that the antenna is located in what is called “free space.” Free space means a place where there is nothing around anywhere close to the antenna which could interact with the antenna, its emissions, or the incoming signals which the antenna is to receive. This assumption is useful in order to show how the antenna patterns its radiation or reception if nothing interferes with the antenna’s functioning. However, in the real world, most antennas are not utilized in free space. Let’s consider the potential effect various interfering factors could have on the performance of practical antennas.

Antennas Near the Earth

In practice, antennas are usually sufficiently near the earth that some of the antenna’s waves encounter the earth very soon after leaving the antenna. These rays may be reflected back to the antenna, reflected in directions such that they eventually combine with other rays from the antenna to strengthen or weaken the antenna’s performance in certain directions, or they may simply be converted to heat as they become cur-

rent flowing in the earth. The manner in which the earth-reflected rays combine with the other rays from the antenna significantly affects the shape of the antenna’s R&R pattern.

Also, incoming rays reflecting from earth near a receiving antenna can combine with the more direct rays from the transmitting antenna to significantly affect the reception of the received signal. This is of greater concern at VHF and higher frequencies than below the VHF band.

Of course buildings, fences, vehicles, or other objects containing conductive material are usually in the vicinity of our antennas, and interact with the antenna’s waves just as the earth does. For example, consider that a large metal building can serve as a reflector for an antenna. If the distance between the antenna and the building is $1/4$ wavelength, there will be an increase in the antenna’s gain in the direction away from the building through the antenna. The antenna’s R&R pattern will display a major lobe in this direction of increased gain, and a greatly reduced lobe in the direction toward the building. Spacing the antenna at various other distances from the building will result in other modifications of its R&R pattern.

Similarly, the angle at which most of the antenna’s earth-directed rays reflect from the earth changes as the antenna’s height above earth is changed. This can also significantly affect the shape of the antenna’s R&R pattern. For example, note the dramatic difference in vertical R&R patterning of a horizontal, halfwave dipole antenna caused by changing its height above earth from $1/4$ wavelength to 2 wavelengths (fig.

1A, 1B, 1C, 1D). Note that an above-ground height of $1/4$ wavelength (fig. 1A) yields a pattern which is good for close-in communications on the lower HF and upper MF frequencies. A height of $1/2$ wavelength (fig. 1B) leads to lower vertical-angle radiation angles and favors DX communications.

It’s not just R&R patterns that are affected. Consider radiation resistance, which is that fictitious amount of resistance which, if it were carrying the same current as the antenna, would dissipate as heat the same amount of RF energy as is radiated by the antenna. The antenna’s position relative to earth affects both radiation resistance and feedpoint impedance. For example, variations in the height above earth of a horizontal, halfwave dipole can cause its radiation resistance and feedpoint impedance to vary from a few ohms to close to 100 ohms. This greatly affects the match between antenna feedpoint and transmission line, and the resulting SWR.

Assisting Mother Earth

It is possible to supplement the conduction of the earth beneath the antenna by use of a radial system or a counterpoise. A counterpoise is usually a rectangular or linear shaped grid of conductors placed under an antenna to reduce ground losses and/or effectively establish antenna height above poorly conducting earth.

Radials are conductors arranged around the base of an antenna like spokes of a wheel around its hub. Radials, usually used with grounded, vertical antennas, reduce ground-return signal losses in these antennas. Whereas radials may be any length and are usually buried just under the earth’s surface, a counterpoise should extend at least a half wavelength in every direction from the antenna, and is above the ground.

To avoid confusion here, note that there are two kinds of radials used in antenna work. The radials in the above discussion are non-resonant supplements to the earth’s conductivity and are placed on, close to, or just under the earth’s surface. In contrast, the radials used with groundplane antennas are resonant elements placed well above the earth. While some counterpoises may be resonant, this is not usually a requirement.

Effects of the Earth on Propagation

The low vertical-angle radiation support for DX mentioned above derives from the fact that HF signals tend to reflect from the ionosphere better if the angle at which they are launched is

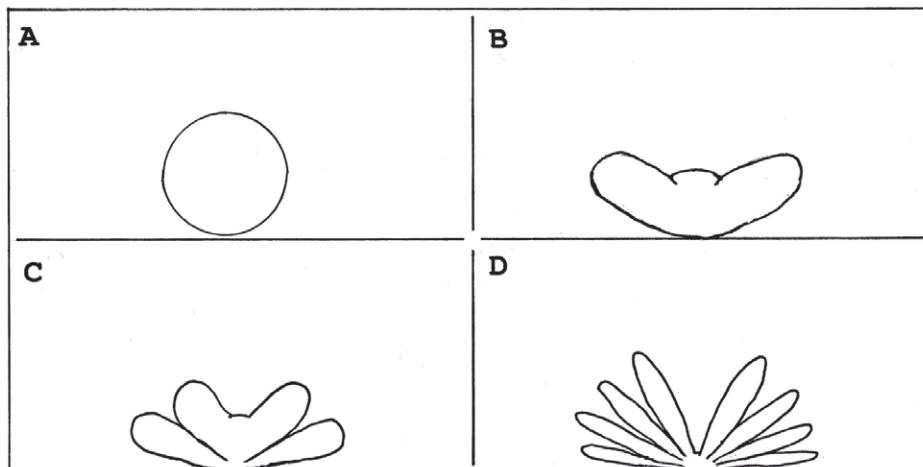


Fig. 1. Approximate vertical R&R patterns of a halfwave, horizontal dipole antenna at heights of $1/4$ wavelength (A), $1/2$ wavelength (B), 1 wavelength (C), and 2 wavelengths elevation above earth (D). Patterns shown are at right angles to the antenna wire.

This Month's Interesting Antenna-Related Web site:

This is a site with links to many antenna-related sites:

<http://hamster.ivey.uwo.ca/~amsoft/amsoft0.htm#antennas>

Click its "back to the table of contents" and you'll find a list of links for many areas of radio.

low. Once they reflect back to earth, they may be absorbed in the earth or be reflected again from earth to try for another skip from ionosphere and back to earth. This is the basis for the legendary ability of the HF band to support worldwide communications with relatively low power when "the skip is in."

Of course, the earth is somewhat conductive and can absorb radio waves by converting the currents they induce in the earth to heat. So if a hill blocks the path of a radio wave, the wave will likely be partially absorbed and partially reflected by the hill. Consider also that in the low to very low frequency bands, vertically-polarized waves tend to travel with their lower end connected to the earth. Thus, they actually tend to follow bends in the earth, including the contours of hills. When sufficiently strong, such signals can propagate completely around the earth over mountains and seas.

For higher frequencies (shorter wavelengths) this path bending by the wave contacting the earth becomes what is known as the "knife-edge phenomenon." In this effect, the shorter waves bend around earth curvatures of smaller radii, such as peaks of hill tops or sharp

ridges, just as the longer, lower-frequency waves bend around the larger radius of the earth's curvature.

◆ And So...

You can see from this brief survey that the earth is an important component in radio communication systems. If you'd like more in-depth knowledge on this topic the *ARRL Antenna Book* is a great resource.

◆ An Historical Earthing Jolly

Lee DeForest was one of the great, early wireless pioneers. A story goes that his assistant was preparing for a balloon flight to make some wireless tests using an antenna dangling below the balloon. Suddenly the assistant realized that it would be impossible during a flight to make a "ground" connection with the earth as was usually done in their wireless system. Not to worry: he dashed off to their lab and returned holding a flower pot complete with flower. Sticking the ground-connection wire into the earth in the pot, he pronounced the system ready to fly!

RADIO RIDDLES

Last Month:

I said: "OK, you know what 'T2FD' means: now what does 'TCFTFD' mean? And

for long-time readers of *Antenna Topics* we might also ask what 'TOTA,' and 'COCO' mean?"

Well, the TOTA is "The Old-Timers Antenna," a long center fed, multiband, dipole antenna fed with low-loss feedline. Made without traps or loading devices, the Old-Timer is still hard to beat. COCO stands for the "coaxial collinear" antenna, a high-gain, vertical groundplane antenna useful and popular on VHF and higher frequencies.

The "TCFTFD" is Joe Carr's name for the T2FD: "tilted, center-fed, terminated, folded dipole." I think he must have invented that name with tongue in cheek as a humorous comment on the multiplicity of names which were already given the antenna (i.e. T2FD, TTFD, T'FD). Just for fun, should we continue that trend with the "WBLNTCFTFD" antenna (wide-band, low-noise, tilted, center-fed, terminated, folded dipole antenna)? No, I think not. Joe has stretched the limit far enough!

This Month:

Is it possible to connect a conductor across a feedline or other source of RF, and expect that conductor to act like an insulator?

You'll find an answer for this month's riddle, another interesting antenna-related web site, and much more, in next month's issue of *Monitoring Times*. 'Til then Peace, DX, and 73.



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Scanning and Recording

Who is using this frequency? What are they saying? These questions form the basis for my interest in scanning and I've spent years pursuing the answers.

Recording transmissions is one of the most powerful techniques in tracking down frequency usage because you can do other things or listen on other frequencies while the recorder performs its job. Later, you can listen to the recording on your own schedule and replay it as many times as you like.

Using a computer equipped with recording software is one approach. Programs like the Dave Jacobs' ScanRecord for Windows (<http://www.davee.com/scanrec>) and the Black Cat Systems Audiocorder for Mac (<http://www.blackcatsystems.com>) provide VOX (voice operated) controls and can commence recording without the delay associated with electromechanical tape recorders.

Portable cassette recorders are by no means obsolete. You can tape overnight and listen to the recording in your car while driving to work the next day.

We've used inexpensive cassette recorders for years. Our first cassette recorder was a Panasonic model RQ-2108, a 1980 model obtained as a free premium for opening a new bank account. The RQ-2108 was a basic model which lacked a remote control jack, so we added a remote control feature, activated by a carrier operated relay we installed inside a Regency K500.

Later, we obtained two Radio Shack CTR-75 VOX cassette recorders. (See "The Radio Shack CTR-75 VOX Cassette Recorder," by Bob Parnass, AJ9S, in *The RCMA Newsletter*, April 1988).

◆ C Crane VersaCorder

We recently borrowed a new VersaCorder from C. Crane Company for evaluation. The VersaCorder is manufactured in China by



Sangean and is larger than most of the Radio Shack cassette recorders. It can be powered by four C batteries or by the 117 VAC power supply.

C. Crane recommends using high quality 110 minute, standard size cassette tapes, and one is included with the VersaCorder. It can record at normal or 1/4 speed; the latter means you can fit a lot more audio onto a single tape. A 3-digit mechanical counter indicates relative tape position.

When operated in VOX mode, the VersaCorder records for an additional 5 seconds after the end of each transmission. This wastes tape and leaves 5 second gaps throughout the tape. The old CTR-75 behaved the same way, but we were able to shorten its post transmission delay time by changing a resistor. (See "Technical Topics," in *The RCMA Newsletter*, July 1988.)

The VersaCorder can be placed into the record mode manually, by remote control relay closure, by voice activation, or using the internal event timer. You can set the start and stop times and day of week for up to six events. The event timer can be used in combination with voice activation or remote control, too.

The VersaCorder has a built-in microphone, an external mike jack, and a line input jack. A slide switch provides three sensitivity settings for voice activation. A red LED lights when recording and flashes during VOX mode.

An optional patch cord lets you connect the VersaCorder to a telephone line for recording phone calls, though we didn't test this capability. The built-in tone oscillator can inject a beep tone periodically to remind the participants their conversation is being recorded.

We are impressed with the VersaCorder. Its larger size makes it easier to operate than smaller models. The large speaker allows playback with a minimum of distortion. The protruding volume control and large pushbuttons are easy to see and adjust. We didn't hear a significant difference in audio quality between full and quarter speed recording of scanner traffic.

The Versacorder comes with a wall wart power supply, one tape, and a triple patch cord. It is available for under \$100 from C. Crane Company, tel. 1-800-522-8862, web page: <http://ccrane.com>



◆ Mr. Scanner FCC Frequency Database

The Mr. Scanner FCC Frequency Database Version 5 is a two-CDROM set containing a portion of the FCC database from 25 - 1300 MHz (in dBASE format) software to query the database. The CDROMs include a set of independent ASCII text files containing reference material of interest to scanner hobbyists, e.g. talk group information for various trunked systems, 10-codes, etc.

The database contains these fields: frequency, call sign, licensee name, county, city, state, service



code, and transmitter latitude and longitude.

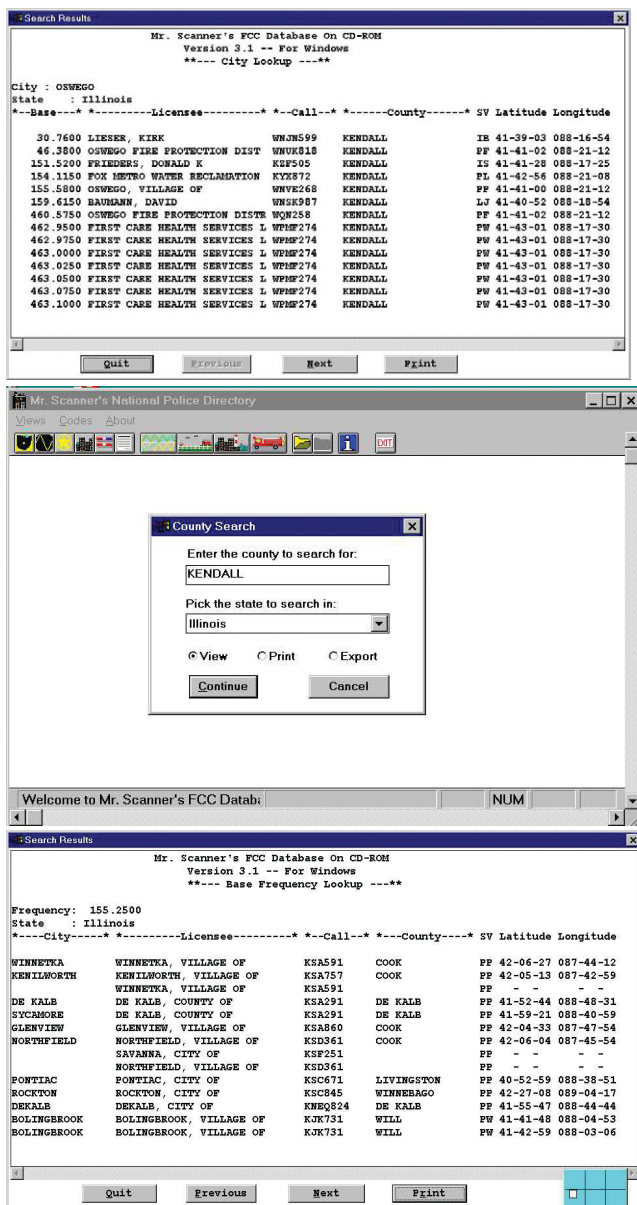
There are both DOS and Windows versions of the software, and we used the Windows version on Windows 98 Second Edition. The software provides several types of queries. All queries permit you to display the results on the screen, print the results, or export the results to either a dBASE or csv (comma-separated values) file.

Select a state (including Washington DC, Virgin Islands, Puerto Rico, and Guam) and you can view:

- All records for the state
- All records for a single frequency
- All records for a given county
- All records for a given city
- All records for a given licensee name
- All records for a given service

An additional four types of queries let you specify a state, and lower and upper frequency limits to restrict the search:

- All records for a state in a frequency range
- All records for a county in a frequency range
- All records for a city in a frequency range
- All records for a service in a frequency range



Two important types of searches are not supported. Despite what the instructions say, we see no query by call sign. Mr. Scanner software provides no search using latitude and longitude, though they are contained in the database and visible in the query results.

The query mechanism compares your search key value to the leading characters of the record field and there's no other pattern matching available. For example, you can search for all records in which the licensee name begins with the word PLUMBING. This will find records for licensees like PLUMBING SUPPLY OF CHICAGO but will miss records for JOHN DOE PLUMBING, CHICAGO PLUMBING, etc.

When searching within a frequency range, the Mr. Scanner software displays an error message if there are no records found which match the bottom limit exactly. For example, if you query for records between 460.0 and 461.0 MHz in Chicago, you will be treated to an error message which states "the range of frequencies between 460.0000 and 461.0000 in the state of Illinois was not found. This may be a valid

request but not found in this search..."

The message then lists the entries closest to 460.0 MHz (459.9500 and 460.0125) and asks you to rephrase your query using one of these frequencies. This approach is serviceable, but it is unintuitive and makes the software more difficult to use.

The Mr. Scanner CDROM software will not run on Linux or Mac operating systems. Linux users can merely read the database file itself, in .dbf format, and use database or query software native to the operating system. If you have a Windows PC, you can perform a query and export the results to a dBASE or csv file for use on your Linux or Mac systems.

Mr. Scanner Installation

You need not install software on your hard drive, because the Mr. Scanner software conveniently runs from the CDROM. The query software is rather crude, but simple to use once you learn how. The instructions furnished in the README file contain mistakes which makes learning more difficult.

Our phone call for assistance from Mr. Scanner was answered promptly on the first ring and the information provided helped us get underway.

Percon's older Spectrum CDROMs are no longer sold, but they contained more data because they weren't restricted to the 25 - 1300 MHz frequency range.

Most, if not all the information on the Mr. Scanner CDROMs is available in one form or another for free viewing on the Internet if you are willing to use a web search engine and navigate the FCC reports. Having the information on the CDROMs is convenient.

Mr. Scanner FCC Frequency Database is available for under \$30 from the Hobby Radio Stop (tel. (937)299-6440, PO Box 291849, Kettering, OH 45429), and other dealers, including Grove Enterprises (800-485-8155; <http://www.grove-ent.com>; 7540 Hwy 64 West, Brasstown, NC 28902).

Yaesu VR-500 Keypad Trick

In July 2002 *MT*, we described how you could use tk500 open source software to enable two hidden menus in the Yaesu VR-500 portable receiver.



Perrin (pezcat19@hotmail.com) found a simple way to enable the hidden NAM (Narrow AM) and User Port menus in the VR-500 without using software: Press and hold the 0, 3, 5, and 9 keys while turning the power on.

NOTICE: It is unlawful to buy cellular-capable scanners in the United States made after 1993, or modified for cellular coverage, unless you are an authorized government agency, cellular service provider, or engineering/service company engaged in cellular technology.

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Useful Computer/Monitoring Holiday Gifts

There is no question that this has been a tough year economically for all of us. Stock, bonds, CDs, money markets and IRAs: they have all left us disappointed and worried. But this is the season for us all to enjoy family, friends and life. It's also time to be a little more kind to the world and to ourselves. So this month we will look at some electronic gadgets that may be useful in your monitoring and computing pursuits.

◆ Key Chain Hard Drive

Sending data from one computer to another can be accomplished in a number of ways. If we have the luxury of a local area network (LAN) and a network administrator, all it takes is the press of a button. But for most of us, it's the SN (sneaker network) method – running the data between computers using floppy disk, Zip disk or CD-ROM ...until now.

Figure 1 shows the Ur-Disk, a pocketable USB hard drive, attached to a laptop. This little device is a little over 3 inches long and weighs less than 0.5 of an ounce. It plugs into any USB port and then works just like a 64 megabyte hard disk. Windows on PCs and MAC OS treat the mini drive as if it were just another system drive.

The difference is that this is one 64Meg hard drive that you can hide in the palm of your hand and plug into another computer without the need of additional hardware. Once plugged in, all the data is available on the second computer.

The Ur-Drive is powered from the USB port and therefore requires no other connections or power supplies. It is security password protected and works on both PCs and Macs with USB 1.1 ports.

Accessories which come standard with the

Ur-Drive are: a 3-foot USB extension cable, a disk containing Windows 98 USB device drivers, and a lanyard for hanging the Ur-Drive around your neck. Yes, it is that small and light!

Installing a Ur-Drive

Although the advertisement says "Plug N' Play – no software required" the fine print says except for Windows 98/98E. Although the advertisement stated that the Windows 98 drivers were on CD-ROM, a 3.5 floppy was actually included. Drive installation on Windows 98 was fast and easily accomplished in one minute. Upon plugging in the Ur-Drive, the system recognized it as a removable drive and included in the system. See Figure 2.

Using the Ur-Drive

Not much to say here. Plug it in. An LED in the mini-drive lights to indicate that it is connected. Then use it just like a hard drive. Write, delete, over-write. It's that simple. I was able to store all of my RadioMax and Scancat frequency files, the latest MT website frequency lists, this article and its figures, all on the Ur-Drive. All this used less than 30 percent of my 64Meg mini drive.

After you store data to the Ur-Drive you can unplug it at any time and plug it into a second computer. Now the data is available on the second computer. It works great! I found it interesting watching the "My Computer" screen. As I plugged and unplugged the Ur-Drive into the computer the "Removable Disk E:" icon appeared and disappeared.

Storing Whole Programs – Maybe

In theory, entire programs could be stored on the Ur-Drive. However, in a Windows environment, critically required program files such as DLLs are often stored with the Windows operating system. If this is the case, and if the program is installed on the Ur-Drive, it will only run on the computer where the program was initially installed.

Since these mini drives are available with memory capacities from 32M to 1G, I suppose that the Windows operating

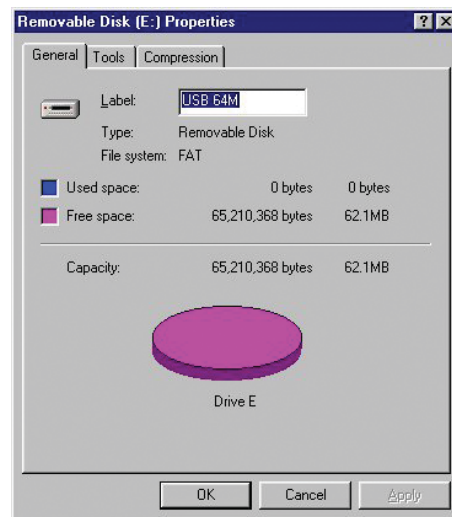


Figure 2 - Windows 98 Handling the Ur-Drive Just Like Any Other Drive

system could be installed on the Ur-Drive. Then programs installed on the mini drive would be transportable between computers. As I said, in theory. If anyone tries this, let us know if theory and practice converge.

What Do I Think?

The lanyard for hanging the Ur-Drive around the neck is a marketing stretch. But in my opinion the Ur-Drive is very, very useful for business, personal and radio monitoring applications. Think of it this way. In its simplest utilization you can store and transport over 50 of your most important floppy disks of data on one tiny three-inch mini disk. The 64MEG Ur-Drive sells for \$48.49 at Cyberguys. (Editor's note - Cyberguys now seems to be calling it simply USB Drive - no Ur.)

◆ MP3 Monitoring Intercepts

It was the MP3 data storage format's data compression efficiency allowed Napster to send music over the Internet. The MP3 compression efficiency allows one CD to store over 60 songs in MP3 format. Not only that, but an MP3 player with 32 Meg of memory can store four hours of voice. Therefore, MP3 is also an efficient format for the storage of voice files, such as monitoring intercepts.

The Coby MP-R650 provides MP3 encoding as well as playing MP3 files. It can record up to four hours of audio from a scanner or receiver, and converts it to MP3 format. And it does it without a computer!



Figure 1 - The Ur-Disk Attached to the USB Port of a PC



Figure 3 - The Tiny, But Mighty MP-R650

What Is an MP-R650?

The MP-R650 (see Figure 3) is a small, palm-held device (approx. 3 x 4 inches) and weighs about 0.2 of a pound. It is powered by two AAA batteries, has an LCD display and 10 function buttons. It has three jacks: Line-In for audio input from audio sources (e.g., scanners and receivers), USB computer connection, and headphone jack.

The MP-R650 comes with 32 megabytes of installed memory, a remote controller, line-in cable, USB cable, carrying pouch and CD-ROM.

A memory expansion slot is provided for MMC type memory.

The unit is especially useful for recording from scanners/receivers, since the Line-In levels can accommodate a wide range of inputs. It has three levels: Low (200-400 mV), Medium (400-600mV) and High (600-800mV).

Tape Recorder Replacement

For the past few years, digital recording programs have been available for Pentium class computers. In fact, digital recorders are built into a number of popular receiver control programs. These recorders require that the audio from a receiver be connected to the computer's sound card input. This audio is then digitized and stored as a data file. The file can then be retrieved and "played" by reconstituting it to audio for listening. This is a relative easy trick for a Pentium computer.

But the little handheld MP-R650 can perform the same encoding function without a computer. This means you can digitally store four hours of audio from your handheld scanner and you don't have to strap a desktop or laptop computer to your back.

The MP-R650 can store the audio in the efficient and ubiquitous MP3 format on the player's internal 32Meg memory. Because the MP3 format is so common, you will be able to download it to your computer for permanent storage and future playback once you get home.

The MP-R650 at Base

The unit comes with a CD-ROM and USB cable for connection to your computer. The Manager Program requires, as a minimum, a Pentium processor with 32Meg of RAM, 20 MB hard

drive space and Windows 98/ME/2000. The program allows display and manipulation of files in the MP-R650's internal memory, MMC memory (if installed), and files on your computer. It also includes an MP3 player.

Except for its Memory Control functions, the program is similar to many other MP3 player programs. However, I felt that it was more intuitive and easier to learn than others. It loaded quickly without problems and operated in the same manner.

A Real Manual!

Many computer products only include a User file on their CD-ROM or floppy. It's left to the owner to print out this file if product information is required. In my book that's not exactly customer service. The MP-R650 is different. The included 37-page *User's Manual* is well written and organized. It gives concise instructions for every function, connection and use. It even illustrates what the unit's LCD will display at each step.

Remote Control? Not Quite

Coby's promo blurb highlights the "Remote Controller" included with the MP-R650. In fact, this is a small box attached by wire to the main unit in the earphone jack. The earphones are then plugged into the remote controller box. In operation it just duplicates the function button found on the main unit. It's a nice touch, but not exactly what I had in mind from its name.

What would have been a nice feature would be the inclusion of a remote turn-on jack as found on many tape recorders. An even better feature for us radio monitoring folk could have been a VOX (voice operated turn-on) setting. Then we could have enjoyed true unattended intercept capture. Are you listening, Coby?!

The Verdict

I have nothing but good things to say about the MP-R650. I find more uses for it everyday. As I said, a VOX feature would have been a nice touch. The price, however, is on the high side at \$189, when most MP3 Players (not Player-Encoders) are selling at the \$100 mark. I guess if you want the latest, you have to pay.

In this case, the portable Encoder feature makes it quite valuable to radio monitors on the go.

Both the Ur-Drive and the MP-R650 MP3 Player-Encoder are available from Cyberguys! along with some other goodies which we will try out next time. So save some of your gift money. Contact them at <http://www.Cyberguys.com> or call 800-892-1010.

❖ Holiday Wishes

Till next time, Season's Greetings to all. Let us all remember the truly important things in life and strive for peace on Earth.

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Tuning Into Broadcast Satellites - Part 2

By Ken Reitz

Last month we looked at the history of satellite TV, a comparison of C-band v. DBS and found out what condition the big dish industry was in. In this part we'll look more closely at the hardware you'll need for reception and exactly what you'll see and hear.

◆ Why The Big Dish?

One of the most often asked questions regarding big dish technology is "Why does the dish have to be so big?" Broadcast satellites, as opposed to DBS satellites, transmit in a much lower frequency range (3 GHz v. 12 GHz) and at considerably lower power output. DBS birds typically transmit at 200 watts while C-band birds put out 16 to 20 watts – a tenth the power.

So, does that mean that we must have 10-ft. monstrosities in our backyards to enjoy C-band satellite TV? The quick answer is yes. To be able to receive all C and Ku-band satellites from horizon to horizon you'll need all the gain that a 10-ft. dish can give you. However, there are reception possibilities with other size dishes and it might be worth experimenting to see what you can get in your area.

Here are two rules of thumb: 1) Analog signals will give a watchable signal on smaller dishes because a certain amount of noise in the picture and audio will be tolerated by most viewers. However, that same amount of noise when trying to get a digital signal will almost always result in "tiling" or break-up of the digital picture and audio. 2) Most broadcast satellites are spaced 2 degrees apart in the sky. This means that when the dish is "looking" at a particular satellite it may receive interference (called *ingress*) from adjacent satellites. This ingress will show up as noise in an analog signal and cause a digital signal to tile or break up. To help reduce

the amount of ingress, satellite manufacturers polarize the channels so that adjacent satellites have opposite polarity on the same channel.

In addition, most broadcast satellites beam their signals to the center of the continental U.S. (CONUS). This means that, because of the spherical shape of the planet, the signal drops off a little as you get out to either coast (about 1,500 miles in each direction). That means that the hottest part of the signal falls in the geographic center of the U.S. and, consequently, you can get away with a much smaller dish in the states from around Colorado to southern Indiana and from Nebraska to Arkansas. How small? Well, a 6 foot black mesh dish will give excellent results in those locations over most of the Clarke Belt with reasonable analog signals and probably decent results on digital *i.e.* 4DTV or DVB FTA signals.

My own experiences in the Mid-Atlantic region is that a 6-ft. dish, perfectly aligned, will give excellent results on analog signals and that a solid 4-ft. aluminum dish with extremely good surface accuracy and a very low noise figure LNB will allow digital FTA reception from C-band satellites. But, you have to take into account the proximity of other satellites to guess whether or not you'll get good results. I once put a 25 degree C-band LNBF on a 90 cm Ku-band dish and, aiming at AMC 2 channel 9, was able to get a very watchable picture and good audio from NASA-TV, despite the fact that AMC 3 is just 2 degrees to the west with WPIX-TV on channel 9. I've gotten noise-free pictures from NASA-TV using a 4-ft. dish and tile-free digital reception of USIA's WorldNet and VOA services on the same satellite.

◆ Not Exactly Maintenance Free

Probably the biggest knock on C-band satellite TV is maintaining it. There's no doubt that the second biggest attraction to the 18-inch DBS system (after the fact of the 18-in. dish) is that it has no moving parts. Once it's set up and running there's no reason to ever worry about a DBS installation. No such luck with C-band.

The typical big dish system, aside from the actual massive parabolic reflector, features a heavy-duty dish mover (called an *actuator*), a C-band feed horn, a servo motor to switch polarity, and an LNB to amplify the received signal. Occasionally things will get loose after several hundred trips back and forth across the Clarke Belt, resulting in misalignment, and ev-

ery now and then lightning will take out a servo motor and LNB.

Can this be improved? Yes. Replacing your feed horn with its servo motor and separate LNB with an LNBF (LNB/Feed horn combination with electronically switched polarity) will help a lot. That means the only moving part on the system is the actuator motor, which is D.C. powered and very hard to destroy. I've been using the same one for over 15 years and it's made countless trips across the Clarke Belt and survived innumerable thunderstorms. Because you're using an LNBF, you need only one run of RG/6 coax for the feed horn and LNBF. The voltage to switch the polarity is carried on the RG/6. You'll still need a run of cable for the actuator motor.

Aside from that, if you remember to unplug your system and disconnect the wires, you may never need a service call. On my own receiver I've installed alligator clips and labeled each wire so that disconnecting for a storm is a snap.

◆ Dedicated Installations

Regardless of whether you're on cable or the little dish for your family's entertainment, you might consider putting in a C-band dish for the satellite TV DXing aspects. Let the rest of the family enjoy their movies and sitcoms and you can play around with your big dish. If you've got the space and no one objects to the presence of a looming 10-ft black mesh dish in your backyard, I encourage you to check out the action.

If you're in an area where restrictive cov-



enants are in place, you're still allowed, by FCC rules, to install a satellite dish up to 90 cm. There's also no rule on how many of these dishes you can set up. Why not put up two or three and connect them with a special switch which allows your receiver to electronically switch between a number of LNBs on a number of dishes? You'll find that 90 cm is big enough to enjoy some minimal C-band reception and great amounts of Ku-band action. You'll be amazed at what you can see and hear. And, if you have the room for an excellent 4-ft dish or a good 6-ft dish, you can set it up on Panamsat 9, which also offers interesting international fare (see chart).

Chart 1: Panamsat 9 (58° W)

Free-To-Air DVB line-up

TELEVISION

Zee TV Africa
EWTN Latin America
Cubavision Internacional
CCTV 4 (China)
CCTV 9
Thai TV Global Network
Arirang TV World 2 (Korea)
Deutsche Welle TV
RTP Internacional (Portugal)
NHK World TV (Japan)
BBC News Feeds

RADIO

EWTN Global Catholic Radio
Radio Paz (WACC-AM, Miami)
China Radio International (English)
China Radio International (Multi-lingual)
Sendas FM (Religious)
Enlace Radio (Religious)
3ABN (Religious)
Deutsche Welle 1
Deutsche Welle 2
Deutsche Welle 7
RAI International (Italy)
Antenna 1 97.2 FM (Athens, Greece)
Latin Music Network
Musica Ambiental
Moderna Juvenil
Musica Romantica
Musica Contemporeneo
Musica Folklorica Latinoamericana
Musica Bailable Latinoamericana
Canal Cultural
Musica de New Age
Musica Bailable del Recuerdo
Musica Disco Dance

❖ Dishes & Receivers, Old & New

Another of the most frequently asked questions is what kind of satellite receiver to buy. What about used receivers? Here are some ideas to consider: If you're just starting out in C-band satellite TV, get your dish for free! That's right, thousands of 6, 8 and 10-ft satellite dishes are lying behind garages all over the U.S., often completely set up, and they might be yours for the asking. All the millions of big dish owners who switched to either of the small dish sys-

tems have these things eating up space in their yards and they'll often be happy for someone to just pick them up and haul them away. All you have to do is ask. If they want \$50 or \$100 don't quibble. All you have to add is the 3-1/2-inch steel mounting pole. If you were to order a 7.5-ft dish new it would cost more than \$400.

As for receivers, you can pretty much have your pick of excellent, practically new receivers for \$50 or less. But, if you're really interested in staying with C-band, the only way to go is to buy the Motorola 4DTV. It's become the *de facto* industry standard with the ability to receive analog, VideoCipherII encrypted, DigiCipherII in-the-clear and DCII encrypted channels. It's the future of the big dish. If you have an existing system, you can add a 4DTV "Sidecar" which allows you to tune the DCII channels using your existing receiver. The Sidecar is considerably cheaper—\$150 compared to \$800 for the complete 4DTV receiver—and could be a good bridge between your old receiver and a new 4DTV. Price shopping is definitely recommended for 4DTV units.

For used receivers look for familiar brands such as Uniden, Drake, or Echostar. The reason is that there were millions of these units sold and all three can still be economically repaired. In addition, it's possible to find lost remotes or owner's manuals for most of these brands. Look for the most recent model as it will have the least wear and most likely chance of having spare parts available.

❖ For More Information

Everything you need to know about basic dish installation can be found in the Skyvision catalog and it's free. Their 52 page catalog contains a chart of all the C-band satellites, their position and channel line-up, a survey of all DVB FTA and 4DTV channels, and other great tips for using and maintaining your system. Call 800-500-9275 and they'll send a catalog right to you.

One of the cheapest places to get new FTA DVB receivers is DVB Express. They're an E-business only, so you'll have to go to their website for more information on their complete FTA systems, including 90 cm dish systems for stand-alone Telstar 5 viewing. They also sell individual components such as dishes, LNBs, receivers, etc. Visit them at <http://www.dvbexpress.com> or <http://www.smallear.com>.

The biggest selection of dishes of every size and for every purpose can be found at Global Communications. Call Mike Kohl at 608-546-2523 or visit their web site at <http://www.global-cm.net>.

For satellite repair the best place I've found is Professional Satellite Repair. They do C-band as well as DBS repair with a 24 hour turnaround window and most repairs costing \$50-60. Call Brian Hoopsick at 877-777-3492 or E-mail Repairs@PSR1.com.



The best place to look for a satellite-by-satellite, channel-by-channel line-up for video as well as audio for every satellite around the world is <http://www.lyngsat.com>. There is simply not enough room to list all the FTA DVB channels available on just Telstar 5 let alone the rest of our region of the Clarke Belt.

Chart 2: Other FTA Channels of Interest

SERVICE SATELLITE

PBS, PBS East, PBS HDTV, PBS Kids, PBS X, PBS You (AMC 3)
Bloomberg TV US (Satcom C3), FOX Sports (Galaxy 11); CTV Network
Canada, Newsworld International (Anik F1); USIA WorldNet, VOA Music
Now, News America (AMC 2)

Chart 3: 4DTV Channels of Interest

TELEVISION

PBS National Feed; Dozens of FOX Sport Regional Channels; Dozens of Pay-Per-View movie and entertainment channels; international channels, numerous channels from Mexico; usual premium movie channels.

RADIO

DMX Music Service (no announcers, no commercials, song info appears on-screen)
37 Channels on Galaxy 4 Ku; 46 Channels on Galaxy 10 C-band; 8 Channels on Satcom C4
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Page Update's Incredible Weather Alert 2000 and Weather Alert Partner

Okay, pop quiz: True or False – the NOAA Weather Radio System has the ability to deliver to deliver statewide, regional, or nationwide alerts of cataclysmic events or imminent danger.

If you answered “True,” as I did until just recently, I have a nasty surprise for you: it just ain’t so. Long-time readers of this writer’s scribblings already know that I am a big time fan of NOAA Weather Radio. I think it remains one of the best deals that we get from our tax dollars. In addition to providing us with information about severe weather, it is also supposed to provide us with information about other hazards. And it can.

But here’s the rub: suppose you had some kind of big disaster – that that spread over a state, a region, or maybe even the whole country – there is no way to issue such a warning through NOAA weather radio. That’s because each of the NOAA weather radio stations is controlled by the local forecasting office, and *there is no network linking all of the stations together*. As a result, there is no way that that the President, say, could push a button and issue an alert that concerns all Americans.

But there is a system that can do the job, the Page Update Emergency Warning System. Based on digital satellite technology, the Page Update system broadcasts data to a wireless network of more than 1,200 satellite downlink transmitters. The network covers more than 98% of the U.S., with a footprint of more than 2 million square miles. An alert or message can be sent to one receiver or a hundred million receivers at one time. These receivers, the Weather Alert 2000 and the Weather Alert Partner, can be addressed by group, sub group, sub-sub group, or by individual.

The Page Update network maintains a complete national operations and weather forecasting center at its headquarters in Nashville, Tennessee. There it receives input from NOAA and emergency management officials from across the country. Bulletins are issued constantly throughout the night and day.

The Weather Alert 2000 is a self-contained desktop unit that measures 4 inches high by 3-1/2 inches wide by 1-1/2 half inches deep. Normally, it operates off house current through an AC wall wart transformer, but it also has four AAA back-up batteries that keep the unit

operating when the wall current is off and allow it to be operated portable/mobile.

The Weather Alert 2000 can be programmed with up to 16 county codes so that the user can keep track of home locations, nearby counties where bad weather originates, business locations, a vacation home, travel destinations, and locations where relatives and friends live. It can even be programmed to receive alerts issued by the FBI.

When a warning is received by the Weather Alert 2000, it sounds a loud 85 dB tone for 30 seconds and flashes a high-intensity LED. The message can then be read on an eight line backlit LCD screen. There are also vibrating alerts and strobe lights available for the hearing impaired as well as “digi-talkers” for the blind and sight impaired.

◆ Weather on the small side

For those who want to be able to carry the same technology with them in a highly portable form, the Weather Alert Partner is a compact 3 inch by 2 inch by 1/2 inch self-contained receiver powered by a single AA battery. It has sufficient memory to retain three text alerts for each of the 16 county codes. When it receives a warning, the Weather Alert Partner will sound one of 15 alert tones for 15 seconds or vibrate, depending on the user’s preference. The Partner has

an eight-line backlit LCD screen for displaying text messages and a zoom capability to double the text size, low-battery indicator, message-full indicator, and mute mode.

◆ Getting my attention

I found both of these products to work extremely well. The vibrate mode on the Partner is enough to knock Rip Van Winkle out of a sound sleep, and the audio tone on the Weather Alert 2000 is fully 85 dB. (While I was writing this review, an alert went off, and now I have the wet pants to prove it.)

The suggested retail price on the Weather Alert 2000 is \$129.95 and on the Weather Alert Partner, \$169.95. Now, here’s the really cool part: until just days before this writing, Page Update had been charging \$119.40 for an annual subscription to alert broadcasts for both products. Now, however, the company has decided that to make the alert service FREE. You pay once for the receiver or receivers of your choice and receive as many alerts as you want absolutely without charge. If a company (Page Update includes United Airlines, International Paper, Florida Light and Power, and Abbott Labs among its clients) or an individual wants the capability to receive nationwide message paging, that service is available for additional charge from Page Update.

It’s my firm belief that you cannot be over-prepared for emergency communications. The Page Update emergency warning receivers get my highest personal recommendation for anyone wishes to protect themselves, their family, or their business. For more information about the Weather Alert 2000 or the Weather Alert Partner, call 1-800-743-4989 or visit <http://www.pageupdate.com>



The outstanding Page Update Weather Alert 2000 and Weather Alert Partner deliver emergency warnings and weather alerts nationwide.



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What's NEW

Tell them you saw it in *Monitoring Times*

Software Radio

WinRadio has announced a new series of dedicated shortwave receivers totally contained on PC card, and, lucky for us, the first in the series is a low-cost receiver intended for hobby use. The WR-G303i is the first commercially available receiver where the final IF (intermediate frequency) stage and an all-mode demodulator are performed entirely in software running on a personal computer and using the computer's sound card rather than a dedicated Digital Signal Processor.



In addition to the flexible user interface of a PC-based receiver with its numerous functions not normally available on a conventional receiver (such as a spectrum scope), the WinRadio G303i Software-Defined Receiver will demodulate the following modes: AM, AMN, AMS, LSB, USB, CW, FM3, FM6, FMN. Additional modes are available in the Professional Demodulator package. For those concerned about being able to receive digital shortwave broadcasting, a Digital Radio Mondiale (DRM) demodulator is on the planning board.

An external model will be introduced soon with similar performance. For the full receiver description and specifications, visit WinRadio's US distributor Grove Enterprises at <http://www.grove-ent.com> or call 800-438-8155. Check also for exact pricing (expected at around \$500) and availability.

Palomar Loop Antenna

Palomar Engineers have an-

nounced a new improved version of their loop antenna system. It has over 10 dB additional gain and sensitivity and features both rotation and tilt to match the incoming wave angle. This provides deep nulls on local noise and allows you to null out a station while listening to another on the same frequency.



The system consists of a loop amplifier and plug-in loops. Loops are available for the LF band 150-550 kHz; the AM broadcast band 530-1700 kHz (including the new expanded band); and the HF band 1700-6000 kHz (amateur 160 and 80 meter bands as well as the nighttime shortwave bands). On HF the loop is particularly useful in noisy locations.

The loop amplifier has a rear panel clip to hold a 9-v battery and an SO-239 (UHF) connection to the receiver. The amplifier and loops are \$135 each (the loops do not work without the amplifier). For more information or to order write Palomar Engineers, PO Box 462222, Escondido, CA 92046; call 760-747-3343 or visit <http://www.Palomar-Engineers.com>

Tower Site Pin-Up Calendar

Here's a great gift for any AM/FM/TV DXer or fan of radio and television transmitter sites. Thanks to Scott Fybush, creator of "Tower Site of the Week" (<http://www.fybush/featuredsite.html>) and NorthEast Radio Watch, hobbyists can gaze at a different 8"x11" color photograph of a broadcast transmitter site every month. The photos are all taken by Fybush at sites in the U.S., Canada, and abroad, and he

promises the reproduction quality is even better than last year's version.

In addition to tower photos, the calendar includes significant dates in radio and television history as well as civil and religious holidays and major industry trade shows and events.

The 2003 *Tower Site Calendar* costs \$16 each, including shipping (\$17.28 includes sales tax for New York residents), and can be purchased by check (payable to Scott Fybush) or money order to 92 Bonnie Brae Ave., Rochester NY 14618. Orders can also be placed by credit card at <http://www.fybush.com>.

Collector's Guide To Antique Radios Fifth Edition by John Slusser

There's something very nostalgic about an old radio; perhaps we remember listening to them during the kinder, gentler days of our youth, and wish to recapture that feeling. This fifth edition to a popular guide certainly takes us



on a tour through the world of antique radio, and gives us some good insight into values as well.

More than 9000 models from the '20s through the '50s are included in this new edition, along with detailed descriptions and fair market values. Models are listed alphabetically by manufacturer, and many photos are provided along with discussions about the companies. A nice glossy publication with 288 easy-to-read pages of useful reference information.

The *Collector's Guide To Antique Radios* is \$19.95 plus \$3 postage from Radio Daze, 7 Assembly Drive, Mendon, NY 14506

In Time for Christmas: Books on CD

Three new releases from Grove Enterprises will be ready in time for Christmas delivery. Here's a preview!

The *Grove Shortwave Directory* has been completely updated and expanded on CD-ROM by MT's assistant editor and columnist Larry Van Horn. The information in this CD would never have fit inside a book: This is the ultimate resource for monitoring the 0-30 MHz spectrum! Not only does it contain comprehensive listings for all shortwave signals in North America, but it lists diplomatic frequencies for over 30 countries; amateur and CB band plans worldwide; and air force, army and navy networks for over 60 countries. The glossaries are extensive, including by-frequency look-up, tables of abbreviations, acronyms and technical terms. The PDF format is entirely searchable. This CD will get a full review to do it justice, but if you don't want to wait, go ahead and order for \$39.95.

Two other CDs make previously published material available in a more accessible format. For more than two decades Bob Grove's popular "Ask Bob" column has been answering hobbyists' questions. Now you can quickly search hundreds of these Q&As and get the answer you're looking for in Bob's typically concise style. The *Grove "Ask Bob" Anthology* is \$29.95.

The *Grove Antenna Anthology* combines three out-of-print books into one giant reference: Bob Grove's *Antenna Factbook*, Clem Small's *Antenna Handbook*, and Wilfred Caron's *Receiving Antennas*. Complete with illustrations, designs, directions, and other data, this CD covers antenna design from LF to UHF for \$39.95.

All CDs are \$3.50 shipping First Class mail, and \$1 for each additional CD from Grove Enterprises, 7540 Hwy 64 West, Brasstown, NC 28902; call 800-438-8155 or email order@grove-ent.com for credit card orders.

Books and equipment for announcement or review should be sent to "What's New?" c/o Monitoring Times, 7540 Highway 64 West, Brasstown, NC 28902. Press releases may be faxed to 828-837-2216 or emailed to Rachel Baughn, editor@monitoringtimes.com

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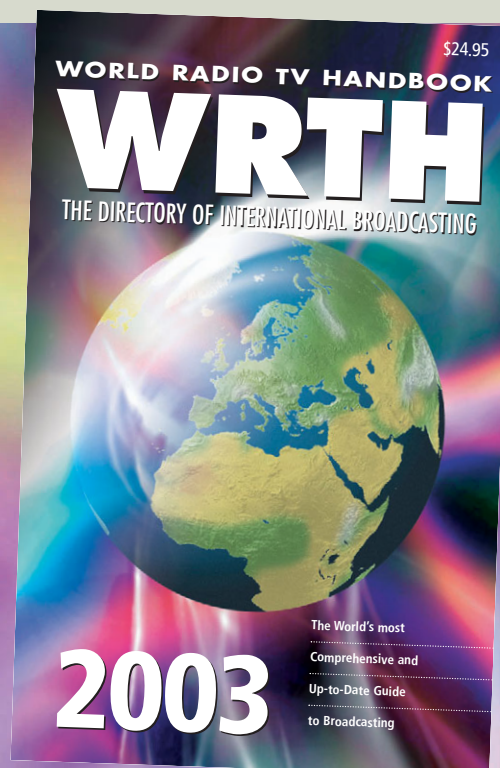
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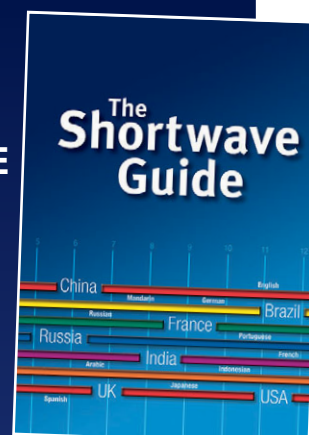
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EDITORIAL STAFF

Correspondence to columnists may be mailed c/o Monitoring Times; any request for a reply should include an SASE.

Frequency Manager	Gayle Van Horn	gaylevanhorn@monitoringtimes.com
Frequency Monitors	Mark J. Fine	markfine@monitoringtimes.com
Program Manager	John Figliozzi, KC2BPU	johnfigliozzi@monitoringtimes.com
American Bandscan	Doug Smith, W9WI	dougsmith@monitoringtimes.com
Antenna Topics	W. Clem Small, KR6A	clemsmall@monitoringtimes.com
Ask Bob	Bob Grove	bobgrove@monitoringtimes.com
Beginner's Corner	Ken Reitz, KS4ZR	kenreitz@monitoringtimes.com
Below 500 kHz	Kevin Carey, WB2QMY	kevincarey@monitoringtimes.com
Bright Ideas	Gary Webbenhurst	garywebbenhurst@monitoringtimes.com
Closing Comments	Bob Grove	bobgrove@monitoringtimes.com
Communications	Rachel Baughn	editor@monitoringtimes.com
Computers and Radio	John Catalano	johncatalano@monitoringtimes.com
Digital Digest	Mike Chace	mikechace@monitoringtimes.com
Easy Access Radio	Jock Elliott KB2GOM	jockelliott@monitoringtimes.com
Fed File	Larry Van Horn, N5FPW	larryvanhorn@monitoringtimes.com
Letters to the Editor	Rachel Baughn	editor@monitoringtimes.com
Milcom	Larry Van Horn, N5FPW	larryvanhorn@monitoringtimes.com
On the Ham Bands	T.J. Arey, N2EI	tjarey@monitoringtimes.com
Outer Limits	George Zeller	georgezeller@monitoringtimes.com
Plane Talk	Jean Baker, KIN9DD	jeanbaker@monitoringtimes.com
Programming Spotlight	John Figliozzi, KC2BPU	johnfigliozzi@monitoringtimes.com
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SW Broadcast Logs	Gayle Van Horn	gaylevanhorn@monitoringtimes.com
The Fed Files	Larry Van Horn, N5FPW	larryvanhorn@monitoringtimes.com
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VR-500 Carry the world with you. (left) Providing continuous coverage from 100kHz–1299.99MHz (cell blocked), the 500 includes reception of narrow and wide-band FM, SSB, CW and AM. Featuring auto mode and frequency step selection, it aligns the user with standard configurations in use worldwide. It also sweeps a band, noting activity, quickly moving to active channels. 2.3" w x 3.7" h x 0.9" d, 7 oz © **\$219.99**

VR-500PACK The 500 packed with an FNB59 and NC60B © **\$224.97**

VR-120D Professional-grade monitoring in the field. (right) The 120D receiver provides continuous coverage of 0.1–1299.99MHz (cell blocked). It features 4-button operation, a BNC antenna connector, preset mode for quick tuning, four one-touch memories, 640-channel memory system, and a wide selection of scanning functions. The 120D can operate from the DC power jack or up to 20 hours on two AA batteries. 2.3" w x 3.3" h x 1" d, 6.9 oz © **\$159.99**



FRG-100B High performance receiver for high priority listening. (top) The FRG-100B covers 50kHz–30MHz (CW, SSB, AM and optional FM). It also features 50 tunable memories, multi-function scanning, all mode squelch, noise blanker, CAT system for PC control, and backlit LCD. 9.38" w x 3.5" h x 9.5" d, 6.6 lbs © **\$549.99**



VR-5000 Multi-mode scanning for world events coverage. (bottom) The 5000, with 2000 alphanumeric memories and direct keypad frequency entry, provides continuous coverage from 100kHz–2.6GHz (cell blocked). Along with a wide variety of scanning capabilities, it features dual receive, auto memory loading, bandscope activity monitor, world clock and time zone map. 7.1" w x 2.75" h x 8" d, 4.2 lbs © **\$599.99**

VR-5000PACK The 5000 and a DSP1, the perfect combination © **\$619.98**

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Prices subject to change without notice.

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"The PCR1000 has something to intrigue and satisfy everyone. This is a fun product." — QST, 7/98

IC-PCR1000 The original black box

The IC-PCR1000 turns your PC into a Wide Band Receiver! Compatible with most PCs and laptops*, the 'PCR1000 connects externally- in minutes! Choose from three different onscreen interfaces tailored to suit your needs, whether beginner or pro.

- 100 kHz — 1.3 GHz[†]
- AM, FM, WFM, USB, LSB, CW
- Unlimited Memory Channels
- Real Time Band Scope
- IF Shift
- Noise Blanker
- Digital AFC
- Voice Scan Control ("VSC" when activated, stops only on modulated signals)
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IC-R75 Pull out the weak signals

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The IC-R75 covers a wide frequency range allowing you to listen in to a world of information. With innovative features like twin passband tuning, synchronous AM detection, DSP capabilities, remote PC control and more - shortwave listening is easier than ever. All this comes in a compact, lightweight package that can be conveniently used in your ham shack, den or car.

- 30 kHz - 60.0 MHz
- AM, FM, S-AM, USB, LSB, CW, RTTY
- 101 Alphanumeric Memory Channels
- Twin Passband Tuning (PBT)
- Commercial Grade
- Synchronous AM Detection (S-AM)
- Optional DSP with Auto Notch Filter
- Triple Conversion
- Up to Two Optional Filters
- Front Mounted Speaker
- Large Display
- Well Spaced Keys and Dials
- PC Remote Control with ICOM Software for Windows® (RSR75)

"A versatile HF/6-meter receiver that offers a good measure of performance in a compact package. All mode capability for the ham and utility listeners and synchronous AM for the SWLs should make the IC-R75 a popular choice for a wide variety of radio enthusiasts." — QST, 1/00

TUNE IN THE WORLD WITH ICOM



IC-R8500 The experts choice

ICOM technology brings you super wide band, all mode coverage from HF to 2GHz, including shortwave and VHF/UHF, while maintaining a constant receive sensitivity. The IC-R8500 is not simply a scanner - it's a professional quality communications receiver with versatile features from high speed scanning to computer control.

- 100 kHz - 2.0 GHz[†]
- AM, FM, WFM, USB, LSB, CW
- 1000 Alphanumeric Memories
- Commercial Grade
- IF Shift
- Noise Blanker
- Audio Peak Filter (APF)
- Selectable AGC Time Constant
- Digital Direct Synthesis (DDS)
- RS-232C Port for PC Remote Control with ICOM Software for Windows®

"If you want a receiver that is both a superior world band radio and a solid scanner, the new ICOM IC-R8500 is the best choice."

— Passport to World Band Radio, 1998

**COMING
SOON!**

IC-R5

Winning Performance

The 'R5's compact size, only 2 1/4" wide by 3 3/8" high by 1" thick, allows you to have a "world of listening" in the palm of your hand. Large internal speaker delivers loud, clear audio - so you can hear everything.

- 150 kHz — 1.3 GHz[†]
- AM, FM, WFM
- 1250 Alphanumeric memory channels
- CTCSS/DTCS Decode
- Weather Alert
- Dynamic Memory Scan
- Preprogrammed TV & Shortwave
- Weather Resistant
- Includes 2 AA Ni-Cds

This device has not been approved by the FCC. This device may not be sold or leased, or offered for sale or lease, until approval of the FCC has been granted.

"With live video reception of broadcast and amateur television, and short range RF based video systems, Icom has opened up a new frontier for the progressive wide spectrum scanner enthusiast."

— QST, 2/01

IC-R3

See & Hear all the action

Wide tuning range allows you to see and hear the excitement behind the scenes. Large easy to read color display for frequency settings and video reception.

- 500 kHz — 2.45 GHz[†]
- AM, FM, WFM, AM-TV, FM-TV
- 450 Alphanumeric Memories
- CTCSS with Tone Scan
- 4 Level Attenuator
- Telescoping Antenna with BNC Connector
- 2" Color TFT Display with Video/Audio Output
- Lithium Ion Power

IC-R10

Advanced performance

With the 'R10 you can tune in the world where ever you go. With a Real-time bandscope and Voice Scan Control to make it easy to find all the action.

- 500 kHz — 1.3 GHz[†]
- AM, FM, WFM, USB, LSB, CW
- 1000 Alphanumeric Memories
- Attenuator
- Alphanumeric Backlit Display
- VSC (Voice Scan Control)
- 7 Different Scan Modes
- Beginner Mode
- Band Scope
- Includes AA Ni-Cds & Charger

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